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TOBACCO CONTROL

AN INTERNATIONAL JOURNAL

Editorials

Legislation to reduce worksite exposure to environmental tobacco smoke

Evidence for the health consequence of exposure to environmental tobacco smoke (ETS) has been accumulating. In 1986, the National Research Council established a committee to examine the potential health consequences of exposure to ETS.[1] They reported that "considering the evidence as a whole, exposure to ETS increases the incidence of lung cancer in nonsmokers." The 1986 US Surgeon General's Report concluded from the available evidence that ETS exposure is a cause of lung cancer.[2] In 1991, the National Institute for Occupational Safety and Health[3] established that ETS met the criteria of the Occupational Safety and Health Administration for classification as a potential occupational carcinogen. In 1993, the Environmental Protection Agency (EPA)[4] labelled ETS a Group A carcinogen, on a par with asbestos and benzene. The EPA estimates that 3000 lung cancer deaths per year are the result of ETS exposure.

This documentation has provided substantial cause for the growing prevalence of worksite tobacco control policies. In 1992, 59% of worksites employing more than 50 persons had a formal smoking policy which either banned smoking, or restricted smoking to separately ventilated work areas.[5] This represents a substantial increase since 1985, when only 27% of the worksites reported such policies. States and local municipalities increasingly are adopting ordinances requiring worksites to restrict smoking. As of 1989, laws in 14 states and 297 communities required such restrictions.[6] Such laws are on the increase.

This issue of *Tobacco Control* includes one of the first articles documenting the salubrious impact of such ordinances on non-smoker exposure to ETS. In their article entitled, "Do smoking ordinances protect non-smokers from environmental tobacco smoke at work?",[7] Pierce and his colleagues analyse the results of surveys of employed residents of communities with no ordinances, weak ordinances, and strong ordinances requiring worksite smoking policies. They found that respondents employed in communities where strong ordinances exist were more likely to work in settings that ban smoking, and were exposed to significantly lower levels of ETS at work.

Worksites are a primary source of ETS exposure, particularly for non-smokers who do not live with a smoker.[8,9] Emmons reported that over 75% of the employed non-smokers they surveyed reported exposure to ETS at work.[9] Despite such high exposure rates, one population-based survey found that 88% of non-smokers were unaware of the health consequences of ETS.[10] Smoking policies can be an effective means of reducing ETS exposure for non-smokers and smokers alike (Hammond K, Sorensen G, Youngstrom R, Ockene J. Passive sampling of environmental tobacco smoke in 24 worksites. In preparation).

In addition, worksite smoking policies are beneficial for smokers. The evidence is mounting that worksite tobacco control policies contribute to reduced consumption of cigarettes among smokers,[11–17] increased quit attempts and success with quitting,[11,12,14,15,17–19] and reduced rates of smoking initiation.[16,17] The number of studies indicating such benefits seems to be accruing more rapidly than evidence to the contrary.[20–24] Smoking policies may also provide support for maintenance of smoking cessation, although investigations of this effect are lacking.[25]

Other studies have suggested that ordinances requiring worksites to adopt smoking policies are effective in increasing policy adoption. For example, in a survey of 793 worksites from 11 communities participating in the Community Intervention Trial for Smoking Cessation (COMMIT), worksites in areas that had ordinances about smoking in the workplace were more likely to have smoke-free or restrictive smoking policies.[26] Unfortunately, however, the presence of such ordinances does not guarantee adoption of restrictive smoking policies by all worksites.. Pierce and his colleagues[7] found that about 40% of indoor workers employed in communities with a strong smoking policy ordinance had no policy or only a weak policy restricting smoking. Similarly, in their 1989 survey of businesses in a community that required that worksites have posted non-smoking policies, Rigotti *et al*[27] found that only 36% of the worksites were even aware of the ordinance. Although 25% of the firms with smoking policies cited the law as the reason for policy adoption, full compliance with the law was low. In requiring worksites to adopt smoking policies, most laws delegate implementation to public health departments, but fail to fund this activity.[6] By viewing these laws as self-enforcing, an inappropriate assumption is often made that monitoring and surveillance are not needed.[28]

As evidenced from the Pierce *et al* report[7] on the California experience, comprehensive smoking legislation is needed to establish and support pervasive norms for smoke-free worksites. Although we must be cautious in drawing causal inferences from the Pierce *et al* study, these findings suggest that legislation can play an important role in reducing ETS exposure. While the presence of such legislation may be an indicator of existing public attitudes in support of tobacco control, these ordinances can also serve to institutionalise such norms and provide ongoing reinforcement of tobacco control.

These findings are of particular relevance in light of new legislation introduced recently in the US Congress. In November 1993, HR 3434, the Smoke-Free Environment

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Act of 1993, was introduced in the House of Representatives by Congressman Henry Waxman (Chairman of the Subcommittee on Health and the Environment of the Committee of Energy and Commerce) and over 40 other members. Senator Frank Lautenberg introduced a companion bill (S 1680) in the US Senate. These bills would require that all nonresidential buildings regularly entered by 10 or more persons in the course of a week adopt a smoke-free environmental policy that either bans smoking inside the building or restricts smoking to separately ventilated and exhausted smoking rooms. The bills would effectively ban or restrict smoking in most indoor environments, including office buildings, schools and other educational establishments, theatres, restaurants, hotels, hospitals and other health care facilities, sports arenas, retail establishments, and manufacturing plants. Legislation of this kind is likely to encounter substantial opposition from the tobacco industry. Traynor and his colleagues[29] recently reported that in its efforts to defeat tobacco control legislation, the tobacco industry has moved from organising smokers and political campaign firms to defeat or weaken local ordinances, to using front groups to conceal its involvement and monitor local legislation efforts. Nonetheless, if passed, such legislation could have far-reaching effects in solidifying social norms supporting tobacco control, and in providing comprehensive protection against exposure to ETS.

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International smoke-free flights: buckle up for take-off

What is the problem?

Why should anyone make an issue of some passengers indulging in a few puffs on an aeroplane? An inconvenience maybe, but will breathing some cigarette smoke really harm anyone? The answer is yes – the important point being that nowhere is environmental tobacco smoke (ETS) exposure a greater risk than during a flight where many bodies are squeezed for long hours into a tiny space in which the tobacco smoke is recirculated.

A billion air travellers every year are at risk, especially frequent flyers, children and, with increased availability of flights, increasing numbers of the elderly or disabled.

An aircraft is also a workplace for hundreds of thousands of people. Flights expose flight crew and attendants to ETS for many hours at a time. The low humidity of the pressurised environment in today's aircraft magnifies tobacco smoke irritation of the lung, throat, nose, and eyes of those operating the controls. The majority of pilots in many countries are non-smokers. Many are former smokers fuming over ETS in the flight deck.

What are the facts?

Readers of this journal already know ETS is a common preventable cause of disease in non-smokers – cancer, heart disease, respiratory illnesses in children, asthma – to name a few. For health workers this is a dead issue, the evidence is overwhelming.

Frequent flyers would be few indeed if they were told, for example, that due to some technical difficulties aircraft cabins contained clouds of benzene gas, that asbestos particles were floating freely, or that they would be subjected to radon emissions. Unfortunately, because tobacco smoking was a feature of most flights before the dangers of ETS were discovered, public opposition to tobacco smoke in aircraft has been in slow motion. Fortunately, in the last couple of years, attitudes and policies are changing.

As the article "Passive smoking aboard passenger aircraft" by Burckhard Junge in this issue of *Tobacco Control* (see pp 50–8) makes abundantly clear, it is not possible to provide both a smoking environment and a totally smoke-free one on an aircraft. That's like trying to provide a chlorine-free end in the neighbourhood swimming pool. ETS simply cannot be contained in one area; recirculated fumes impinge on all occupants. There are only two solutions: 1) provide separately ventilated smoking areas, or 2) ban smoking. There are no available half measures. The former is virtually impossible; the latter the only realistic answer.

Although relatively few aircraft accidents have been assessed as definitely having been caused by smoking, the potential clearly exists and will increase as huge aircraft carrying 500 to 800 passengers come into operation. Indeed, even in a 400-passenger aircraft with 100 seats for smokers, the knowledge that some 100 naked flames will appear as soon as the "no smoking" sign goes off is never a reassuring thought.

The dangers of on-board furtive smoking have been recognised by civil authorities around the world and the technology exists to ensure that the cabin crew could be immediately alerted by any attempt to smoke or disable the warning system. Even more important from an aviation safety point of view, is the fact that the technology exists to install automatic fire extinguishers where there are combustible materials. This would be a good precaution whether or not the aircraft is to be operated as smoke-free transportation.

ETS exposes flight crew and cabin personnel to high concentrations of carbon monoxide over extended periods of time. This exacerbates decreased blood oxygen levels as altitude increases, which in turn impairs night vision and general performance.

Many nations are increasingly taking action to control ETS in public places and workplaces and aboard public transportation. Momentum is for health. Smoking bans on aircraft have been implemented by increasing numbers of airlines and legislated by a growing number of countries, and after a short adjustment period, the carriers, the cockpit and cabin crews, and the passengers have clearly welcomed the ban.

What is the background?

"Rendez-vous '91", a series of meetings organised by the Canadian Cancer Society in Ottawa and Montreal in February 1991, was the first international summit for smoke-free skies. It was attended by a number of tobacco control advocates from North American and European health agencies as well as flight attendant unions. The meetings were the first international gathering to plan a detailed strategy to obtain international smoke-free flights. One session was held with Transport Canada officials to discuss new Canadian legislation phasing in smoke-free international flights over a three-year period. Also included was a meeting with senior officials of the International Civil Aviation Organisation (ICAO), a United Nations body charged with developing international aviation in a safe and orderly manner. It was agreed by those present that a network would be organised to enable sister health organisations around the globe to lobby ICAO member states on the issue.

In May 1991, the World Health Assembly passed a resolution urging all Member States "to ban smoking in public conveyances where protection against involuntary exposure to tobacco smoke cannot be ensured, and the adoption of effective smoke protection whenever possible". This passed unanimously, indicating that the resolution had broad support worldwide.

Over a thousand delegates at the April 1992 Eighth World Conference on Tobacco or Health held in Buenos Aires passed the following resolution: "The Conference strongly urges the International Civil Aviation Organisation to adopt provisions prohibiting smoking on all commercial, passenger aircraft flights, domestic and international, and to collaborate with the World Health Organisation."

A coalition of health workers around the world at a conference luncheon meeting in Buenos Aires organised by the Canadian Cancer Society and the American Lung Association has since been working behind the scenes in many countries and with international bodies to help them understand the health issues at stake.

Health groups were flying high after the triennial

Assembly of ICAO took the strongest tobacco control steps to date by an international body. Representatives from 152 nations meeting in Montreal from 22 September to 8 October 1992 adopted a resolution, initiated by Australia and Canada, to prohibit smoking on all airline passenger flights worldwide. The resolution urged all Contracting States to take necessary measures as soon as possible to restrict smoking progressively on all international passenger flights with the objective of implementing complete smoking bans by 1 July 1996. There was active support at the meetings from officials of the World Health Organisation (WHO) – a welcome example of cooperation between international bodies. The key victory was getting a date for implementation specified as some countries were lobbying to leave it open-ended.

Assembly agreement was reached by unanimous consensus despite lobbying and fierce discussions behind the scenes. After the decision, however, the Delegate of the United Kingdom put on record that he felt the resolution was premature as it prejudged the outcome of technical studies on safety aspects of complete smoking bans. Furthermore, he stated that smoking on an aircraft should be a matter of judgment of the airlines that would have to implement the ban. Delegates from a number of countries associated themselves with that view: Spain, Germany, Denmark, Madagascar, Portugal, The Netherlands, Greece, Ireland, Mexico, Belgium and Sweden.

An important argument in convincing the Assembly to move on this issue was a reminder that, although flight safety is the primary objective of ICAO, it had also acted on other kinds of issues including aircraft engine emissions, depletion of the ozone layer, aircraft noise levels, and even social issues such as Apartheid. It was also pointed out to delegates that the WHO and the International Labour Organisation (ILO) stress that matters of occupational safety and health are interrelated, cannot be separated, and are reflected in many national occupational health and safety laws.

Where do we go from here?

Health organisations must not go to sleep thinking that the ICAO Assembly has spoken and all is well. The option of smoke-free flights is certainly seen by airlines to have marketing significance. They are feeling the impact of the current economic situation, and are motivated to avoid measures that could lose them passengers. Health organisations must therefore move with aviation speed to:

- Show government officials and airlines themselves that a number of airlines such as Air Canada and Cathay Pacific have aggressively marketed with "bottom-line" success a smoke-free environment.
- Work for measures which preclude the choice of smoking or smoke-free environment being a marketing factor for airlines.
- Underscore the importance of international cooperation in implementing the worldwide ban under the leadership of ICAO.
- Encourage governments to work for bilateral and multilateral agreements to phase in the ICAO ban while keeping level the airlines' competition playing field. For example, any two countries could agree to implement a smoking ban on all flights between them, with the ban applying not only to their respective airlines, but also to those of other countries allowed to provide air service between the signatory nations.
- Increase the number of smoke-free air routes to encompass large areas of the globe. A good start is currently being negotiated over the Pacific through an agreement between the US, Canada, Australia, and New Zealand.
- Urge governments and airlines to launch a campaign for a smoke-free transatlantic sky.
- Urge travel agents, their companies and trade associations in each country to publicise the availability of smoke-free flights. Non-smokers are often not informed by travel agents about smoke-free options.
- Lobby national governments to comply with a request of ICAO Secretary General, Dr Philippe Rochat, in a letter dated 14 September 1993 to Member States, requesting that smoking be banned by 14 December 1994 to mark the 50th anniversary of the signing of the Convention on International Civil Aviation at Chicago. That day has been declared International Civil Aviation Day.
- Urge national aviation authorities to respond to an ICAO questionnaire circulated in December 1993 on technical aspects of implementing the ban, about partial or total bans already in effect in each country, and about the intentions of civil aviation authorities in this regard.
- Put this issue on appropriate agendas for national health agency and coalition meetings as well as those of international bodies such as the International Union Against Cancer.

In conclusion, we must remember that much more is at issue here than frequent flying. As many international travellers are opinion leaders in their own countries, smoke-free flights can be a high-profile symbol of successful advocacy efforts in tobacco control. Countries moving ahead on this issue can become excellent role models for opinion leaders from other countries who can take home the message that it is important to eliminate ETS from places where people work, live, and travel.

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The economics of tobacco trade: enabling the transition

This issue of *Tobacco Control* features an address to the 9th World Conference on Tobacco and Health by Howard Barnum, a senior economist at the World Bank.[1] In his address, Barnum makes three points. First, tobacco consumption (and therefore, the associated mortality and morbidity rates) is destined to rise worldwide, particularly in developing regions. Second, the costs to society, narrowly defined as direct health-related expenses and loss in productivity, far outweigh the benefits of the existence of the tobacco industry as an economic activity. Finally, this imbalance calls for policy action on the part of governments to curtail the consumption of tobacco.

The logic of the Barnum and similar arguments is impeccable. The aim of this editorial is not to question Barnum's conclusion, but rather, to briefly discuss the matter of costs and benefits, and to probe in a bit more detail *transition* costs and institutional arrangements, so as to suggest further research and policy directions.

It is not clear which way the bias contained in estimates of the net costs of tobacco consumption operates. Clearly, costs associated with increased morbidity and mortality differ across countries, and indeed within countries. Even using national averages on figures like health care costs and lost income, (or global averages, as Barnum does in his background paper[2]) can be problematic in light of skewed income/wealth distribution or differing access to health care for different groups in a particular country. On the other hand, it is also the case that morbidity rates due to tobacco use are typically under-reported in developing countries.

What this really points to is the need to conduct region-specific or country-specific assessments of the costs associated with tobacco-related morbidity and mortality. At the very least, we need to differentiate between net tobacco users and producers, as this distinction has serious balance of payments, public finance, and regional development implications, addressed below in more detail.

The Barnum argument for higher taxes on the use of tobacco would be buttressed if the case were made not only on optimal tax grounds (as factoring in costs at developing country levels significantly lowers the required optimal tax rate), but rather, on demand elasticity ("sin taxes") grounds as well.* This goes against a fundamental tenet of economic efficiency (and Bank-Fund adjustment programmes), which is to minimise distortions, and simplify tax regimes, but nonetheless merits our attention. This leads to the second theme of this editorial.

Although globally tobacco reduces social welfare, there are individual countries and regions within them, and individual governments or levels of government, which have come to rely heavily on tobacco production and processing as an economic activity. While Malawi and Zimbabwe come readily to mind, the fact is that almost every country in the world has regions or sectors within it which rely on the tobacco industry as an economic activity.

Even though the sale of tobacco is likely to be more price-sensitive in developing countries than in industrialised countries,[3] it will be possible to tax its consumption, alter (slightly) its pattern of use, and yet maintain it as an industry in tobacco-producing areas. However, if serious and pro-active efforts are made to curtail its consumption, then the budgetary and livelihood implications of moving away from tobacco need to be examined.

The issue is complicated by the fact that whatever commodity-oriented industry growers are persuaded to enter, it is unlikely that the commodity price will be as buoyant and stable as that of tobacco has been. Besides, tobacco companies have a reputation for paying cash, and on time, something that cannot be said of many public-sector enterprises, often encumbered with severe cash flow problems.

In the short run, tobacco-exporting countries will face significant reductions in their foreign exchange earnings (Malawi, for example, derives approximately two-thirds of its export earnings from tobacco). Governments, too, will face the prospect of lower revenues from export and processing taxes related to tobacco. Individual regions will face structural issues that any "one-industry town" must eventually face.

If the current situation is undesirable, and a tobacco-free future is clearly superior, then it is time to think of enabling the transition from one state to the other. It is here that the potential of the Barnum paper, and indeed that of organisations such as his and ours, remains largely untapped.

If net gains – tangible financial savings – are to be made from reducing tobacco consumption, then consideration must be given to mechanisms or institutional arrangements wherein at least a part of these gains are transferred to support the adjusting regions during the transition. This is a particularly tricky issue if the gains will only be realised many years after an anti-tobacco policy is instituted, or if the calculation of the gains depends on the value of certain parameters. Secure in the knowledge that tobacco control policies will result in tangible future gains, the inter-

* Simply defined, an optimal tax is one that equalizes the benefits of lower tobacco consumption (principally financial estimates of reduced morbidity and mortality) with the costs of lower tobacco consumption (ie, lost income for the tobacco industry and a measure of foregone "satisfaction" for consumers). The point being made here is that there is no reason why tobacco could not be taxed even beyond this point. Of course, the argument for this depends heavily on what alternative use the revenues thus raised are put to by governments.

national community should, at the very least, be willing to put up money today to fund transitions away from tobacco.

From a development or political economy point of view, the situation is not unlike the issue of the European Union's Common Agricultural Policy. Tobacco lobbies in the US, Europe, and Canada have maintained their existence in the face of strong market and environmental pressures to do otherwise, through skilful manipulation of the political process. There is no reason why African farmers should pay the price for the self-interested (what economists call "rent-seeking") behaviour of tobacco interests (cultivators and manufacturers) in rich countries. Someone, somewhere needs to articulate this to policy makers in developed countries, and it is not unreasonable to expect multilateral organisations and national development constituencies within their own countries to principally take on this task. They have done so with great effect, for example, in articulating the benefits of global free trade over parochial national interests and policies.

Finally, Barnum outlines the Bank's policy vis-à-vis tobacco. It is clear and to the point. The next step would be to think through the implications for growing and processing regions of decreased world consumption of tobacco, and to support transition initiatives in pilot areas. In fact. the Bank is ideally suited to be the broker for any mechanism to administer a transition fund based on global savings from decreased tobacco use. There are lessons to be learnt, both positive and negative, from experience with the Global Environmental Facility, the fund established to finance environmental projects that carry national implementation costs, but global net benefits.**

Barnum ends with a "simple message". The message in this editorial is equally direct. Tobacco is a losing economic and social proposition. That shown, we must start work on the task of designing and enabling an appropriate adjustment path from a clearly undesirable state to one that is superior.

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Editor's note

In response to the costs and benefits of tobacco production and consumption in the developing world, the International Development Research Centre has launched the **International Initiative for Tobacco Policy Research**. This multi-donor consortium will fund economic, agricultural, environmental, health, social, and legislative research in support of effective public policy and in support of the development of feasible transition initiatives for tobacco producers. The Initiative will also fund capacity-building and information dissemination activities.

** An externality is a positive or negative by-product of the consumption or production of a good which is not reflected in its market price. We recognise that the analogy of tobacco as a global externality is imperfect. In the case of a true global externality, such as protection of the ozone layer, in which a country (such as Brazil) is asked to curtail deforestation in the interests of saving the world's (not just Brazil's) atmosphere, a case may be made for having a mechanism like the Global Environmental Fraternity to "tax" the world and compensate individual countries that bear most of the costs of implementing the environmentally friendly policy. In the case of tobacco, the analogy is not perfect because the costs and benefits of curtailing the tobacco industry are often centered in the same country but among different groups, certainly more so than in the case of many environmental initiatives. The general point being made here is this: to the extent that already poor countries or groups within them will be affected disproportionately by tobacco consumption-reducing policies, there is scope for a mechanism that eases their transition from tobacco-related activities to other less socially harmful ones.

Tobacco industry funding of biomedical research

For several decades, the tobacco industry has provided funds for biomedical research. The Tobacco Institute Research Committee (later the Council for Tobacco Research-USA) was formed in the US in 1954, in response to continued reports of the hazardous nature of cigarettes. The Institute's formation was heralded with full-page newspaper advertisements entitled "A Frank Statement to Cigarette Smokers". The advertisements contained the pledge: "We accept an interest in people's health as a basic responsibility, paramount to every other consideration in our business."[1] It is useful to reflect upon whether or not the tobacco industry has lived up to this high-minded statement.

The Council for Tobacco Research-USA (CTR) has funded projects of particular interest to the tobacco industry, through its Special Projects division, and other scientific research. The Special Projects division, directed by lawyers, recruited scientists for particular research projects that might shed doubt on evidence linking smoking to disease and has supported scientists with unconventional views on smoking and health. For example, the Special Projects division has provided more than $1 million to Dr Carl Seltzer, a biological anthropologist who disputes smoking's role in causing heart disease. Similarly, Dr Theodor Sterling, who believes that population studies linking smoking to illness obscure their more likely cause – occupational exposure to toxic fumes - received $1.1 million for research during 1977–82. The nefarious workings of the Special Projects division were well described in a recent article.[2]

In contrast, the more respectable work of the CTR may seem rather benign. The organisation is advised by a Scientific Advisory Board (SAB) composed of distinguished scientists; over the years, the CTR has provided hundreds of millions of dollars to independent investigators, in the US and abroad. The SAB reviews research applications and selects the projects to fund. Reportedly, recipients are accorded complete independence in their research, once funded. Without question, thousands of worthy projects have been funded through the CTR.

Upon closer examination, however, the mainstream research support of the CTR becomes problematic. A review of recent CTR annual reports indicates that only a small fraction of research projects deal with the health impact of tobacco use. This is in sharp contrast to the organisation's stated mission: to research "questions of tobacco use and health."[3,4] One may legitimately ask, "Why does an organisation ostensibly set up to research tobacco and health fund so few tobacco-and-health projects?" Several possibilities come to mind. Perhaps the SAB systematically rejects research proposals that deal with tobacco and health. Alternatively, tobacco-and-health researchers may decline to apply for CTR funding, either because they assume they would not be funded or because they are concerned that industry funding would jeopardize the integrity of their work. For whatever the reason, it is apparent that questions of tobacco and health are rarely funded by the CTR.

This presents a serious problem. Tobacco industry correspondence, publications and, on occasion, Congressional testimony, erroneously state that the CTR is actively engaged in researching the health effects of tobacco.[5] For example, a 1983 Tobacco Institute publication states, "Eminent scientists believe that the questions of smoking and health are unresolved and that research in this area must go forward."[6] The publication further implies that the CTR is a vehicle for that research. In fact, it is not.

The CTR's funding of research has also been used by the tobacco industry in court cases to cast doubt on the facts about smoking and health, and to gain innocence by association with reputable institutions. For example, during a 1990 US (Mississippi) cigarette product liability trial, the jury was shown large charts identifying the many universities and medical schools supported by CTR grants.[7]

None of this will surprise most readers of *Tobacco Control*. It is a central tenet of our experience that the tobacco industry does not dispense money for charitable purposes. Indeed, a 1978 tobacco industry memo stated that, "It is extremely important that the industry continue to spend their dollars on research to show that we don't agree that the case against smoking is closed."[8] Reflecting this, the CTR has been described as "the tobacco industry's main vehicle for damage control."[2]

US organisations and institutions have begun to reconsider the propriety of accepting funding from the CTR and other tobacco industry sources. In December 1992, the American Medical Association (AMA) House of Delegates voted to discourage strongly all medical schools and their parent universities from accepting research funding from the tobacco industry. The AMA Board of Trustees later defined the tobacco industry as firms that directly produce or market tobacco products along with their research and lobbying groups, including the CTR, the Smokeless Tobacco Research Council, and the Tobacco Institute.[9] In addition, two well known Boston-area hospitals, Massachusetts General Hospital and Brigham and Women's Hospital, both announced that, as of 1 January 1996, they will no longer accept research funds from either the CTR or the Smokeless Tobacco Research Council.[10]

In this issue of *Tobacco Control*, Walsh and Sanson-Fisher explore the policies and practices of Australian institutions of higher education as regards tobacco industry funding of biomedical research.[11] The study demonstrates that, as in many other areas of tobacco control, Australia is far advanced in thinking about this issue. Several major Australian medical associations are on record as expressing strong opposition to industry funding, and two Australian funding organisations prohibit persons currently receiving tobacco industry funds from accepting their financial support.

The authors surveyed 42 Australian institutions of higher education. Fully 29% (12 institutions) had discussed the ethics of accepting funds from tobacco industry sources in meetings of their faculty Senate or other governing body. Of these, several had developed policy in relation to one or more of the tobacco industry funding sources. Many did not officially circulate tobacco industry promotional material and a few did not permit staff to accept funds from one or more industry source. On a negative note, 71% of institutions had never formally discussed the ethics of accepting tobacco industry funds and 87% of institutions without written policies banning

industry funding did not expect their position to change soon.

The authors outline several strategies for accelerating the trend of institutions refusing tobacco industry funding. Among the most promising is to encourage institutions and organisations that fund health research to require that prospective grant recipients refuse tobacco industry funds as a condition of receiving their grants. This approach has been pioneered by the Western Australian Health Promotion Foundation (Healthway). Public and private funders of health research should strongly consider emulating this tactic.

I take a personal interest in the area of tobacco industry funding of medical research because I worked in a Tobacco Institute-funded laboratory for several months during my graduate school training. I distinctly remember the laboratory director, a very honorable man, describing with amusement and amazement the fact that the tobacco industry gave his laboratory significant funds with no strings attached whatsoever. Not surprisingly, the laboratory's research had no direct bearing on smoking and health. In retrospect, I believe that neither the laboratory director, nor anyone else in the department, and perhaps no one at the medical school, had any notion of how their good name was being used.

Scientists invest many years in arduous, demanding training. Most face tremendous difficulties securing positions and financing their research. The overwhelming majority of scientists have little or no knowledge of the public policy issues surrounding tobacco control. It should come as no surprise that many have greeted tobacco industry funding with open arms. Nonetheless, we should not underestimate people's capacity for ethical behaviour, if presented with the facts at hand.

There is a serious lack of information about the international scope of tobacco industry funding of biomedical research. In which countries does the tobacco industry provide support for biomedical research? How important are these funds for supporting biomedical research? Walsh and Sanson-Fisher found that 30% of the Australian institutions they surveyed accepted industry funding during the period 1991–2; information on the magnitude of the funding was not available. A survey of US medical schools determined that 54.7% accepted research funding from the tobacco industry and its subsidiaries; for the vast majority, such funds accounted for less than 1% of their research budget.[12] Similar data are needed for other countries.

In countries in which the tobacco industry supports biomedical research, have institutions or agencies considered the ethical issues surrounding tobacco industry funding? The British Medical Research Council frowns on its research staff accepting funds from sources that might bring the Council into disrepute, including the tobacco industry (personal communication, Jane Lee, 6 September 1994). Little is known about the policies of other British institutions, and agencies in other countries.

On a related note, the CTR's annual reports indicate that, for most projects, the CTR was not the sole funding source. Typically, projects are supported by the CTR and one or more public or private research agencies, for example, the US Public Health Service, the US National Institutes of Health, the American Cancer Society, and the Juvenile Diabetes Foundation, to name just a few. These other funding agencies may wish to consider whether or not it is appropriate for both the tobacco industry and pro-health funders to be providing support for the same research project.

The most critical information gap concerns what the tobacco industry gains in return for its support of biomedical research. Although this information may be hard to come by, it is crucial to our efforts. Without specific examples of how the industry has used its support of biomedical research to subvert public health goals, it will be difficult to persuade scientists, research institutions, and the general public that tobacco industry funding of biomedical research is not good public policy.

Studies such as that by Walsh and Sanson-Fisher can provide an entry point for correspondence and discussion with those who most need to hear our message: scientists and research institutions. We must convince them that acceptance of tobacco industry funding is unethical and that, in the long run, it does not serve their or the public's best interest. Despite their feelings to the contrary, taking money from the devil does not always mean that the devil has less money to spend. Scientists and research institutions should be encouraged to clean house before others seek to clean it for them.

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Low smokeless tobacco tax contributes to smokeless epidemic

The remarkably low level of cigarette taxation in the US is well-documented and has been the subject of much attention in recent years.[1] What is less well known is that the US federal government taxes smokeless tobacco products at about one-tenth the rate of cigarettes (see figure). Indeed, at 2.7 cents per tin of moist snuff and 2.3 cents per pouch of chewing tobacco, smokeless tobacco is virtually untaxed at the federal level. Taxation by the states is uneven. Sixteen impose no smokeless tax at all; of the 34 that do impose a tax, 26 impose smokeless taxes that are within 10% of the rate imposed on cigarettes.[2]

This low level of taxation, combined with aggressive youth-oriented marketing by the smokeless tobacco industry, has created what the US Department of Health and Human Services has called "an impending oral cancer epidemic".[3] At a time when use of all other tobacco products is declining, moist snuff sales grew 47% between 1986 and 1990.[4] The smokeless tobacco industry continues to deny that its products cause cancer and are addictive, despite research showing that long-term snuff users are almost 50 times more likely to develop cancers of the gum and buccal mucosa (the tissues that come into direct contact with the tobacco),[5] and that the typical dose of snuff contains two to three times more nicotine than a single cigarette.[3]

Because smokeless tobacco users are disproportionately young and economically disadvantaged, it is not surprising that they would be especially sensitive to tax increases, as suggested by new data reported by Ohsfeldt and Boyle in this issue of *Tobacco Control*.[6] Documenting the correlation between smokeless tax rates and consumption is an important step forward in policy research, and will assist efforts to raise smokeless taxes at all levels of government in the US and around the world. As the authors themselves are quick to point out, however, their ecological research is an initial step. Additional research is necessary to accurately measure price, income, and tax elasticities of demand for smokeless products.

An equally important finding by Ohsfeldt and Boyle is that higher cigarette taxes are associated with higher smokeless tobacco usage. This, too, is not surprising, given that smokeless tobacco and cigarette manufacturers are competitors in the market for nicotine.* If the price of one nicotine product goes up, some users are bound to switch to an alternative source. The authors have performed a valuable service by providing data to reinforce economic theory. Their work provides a powerful reminder that tobacco taxes should be imposed on an equivalent basis on all tobacco products.

During the past year, the smokeless tobacco industry in the US lobbied aggressively to maintain its low tax rates and its huge tax advantage over cigarettes during the vigorous debate over how high to raise tobacco taxes to help pay for various health care reform proposals. The debate was left unresolved, for now, when Congress adjourned in 1994 without passing any health care reform proposal. The smokeless tobacco industry's chief arguments against a significant tax increase were that raising

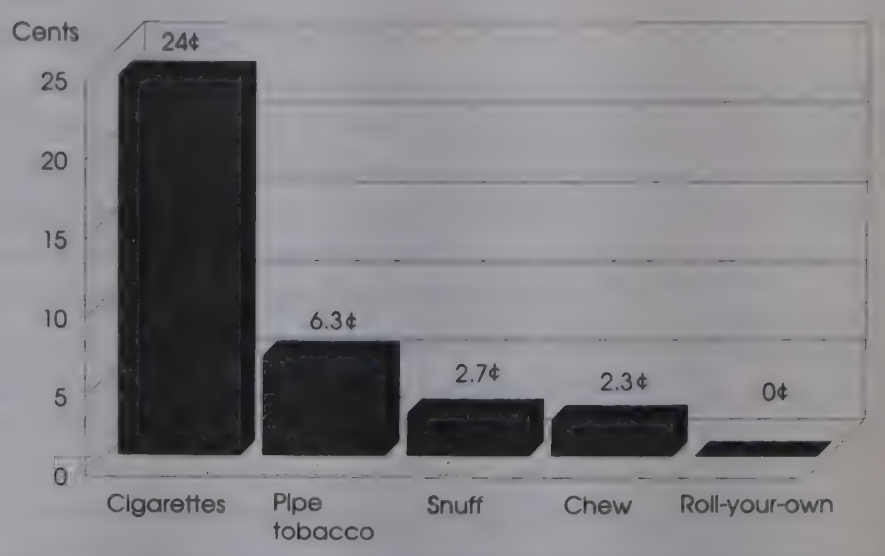

Figure *Current federal tax on tobacco products in the US per retail unit*

and equalizing tax rates on all tobacco products would require a huge increase when expressed in percentage terms, and that such a large tax would put some smokeless companies out of business.

The large percentage increase, of course, is the result of measuring from a starting point close to zero. The argument that smokeless tobacco companies would go out of business if taxes are raised and equalised with those applied to cigarettes also is deceptive. UST, the giant multinational corporation that commands 87% of the US snuff market, certainly would not be endangered. UST was the single most profitable company on the New York Stock Exchange in 1993, with profits of more than 50 cents for every dollar of revenue.[7]

The message to policy makers and advocates should be loud and clear: smokeless tobacco is not a safe alternative to smoking and deserves no special treatment. Cigarette taxes should be raised substantially and smokeless tobacco taxes should be set at an equivalent rate. To tax smokeless tobacco at a lower rate would continue to encourage smokeless tobacco use and would continue to provide an economic windfall to companies that market a deadly and addictive product.

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Tobacco addiction in India

The following is the first of three parts of data of tobacco addiction in India in the next three issues. The magnitude of the problem speaks for itself. We do hope this data will mobilise the public opinion and the opinion of the majority of the Honourable Members of Parliament (both the Rajya Sabha and Lok Sabha) to contain and curtail the growing, production and manufacture, promotion, distribution and sale of tobacco and tobacco products in the country. In this issue we cover data for the country ,Maharashtra , Goa and four southern States.

The particular format has been adopted so that, those who wish to use it for transparencies during conferences or lectures can use it directly without readjustment by photocopying it directly on 100 mircon film for overhead projection. Those who desire detailed information may contact Senior Research Officer, Goa Cancer Society, Denis Apartment, Lake-View Colony, Panaji, Goa 403 003, India.

Introduction

Tables are presented showing the extent of tobacco addiction in the different states of India, the main source of the data being Sarvekshana [1]. The tables provide the number and percentage of regular tobacco users among persons of age 15 years and above, the rate of their smoking and the most common smokeless habit for rural and urban areas for both sexes. The number and percentage of regular users of tobacco among children below 15 years are also presented. Estimates are also given of the average number and percentage of persons of age 15-24 years who pick up tobacco habit in a year. In this issue the following states, Maharashtra, Goa, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala are covered.

Methodology

Sarvekshana, the journal of the National Sample Survey organisation of the Ministry of Planning, Government of India, Vol XV, has provided tables of the prevalent rates of tobacco use in rural and urban areas of all the states and Union Territories based on a nationwide sample survey of consumption carried out between July 1987 and June 1988. The tables provide the prevalence rates for four categories of tobacco products: (i) Smoking (ii) Chewing (iii) Snuff and (iv) Burnt tobacco powder/paste.

Estimates of rates of regular use are given sex wise for 5 age groups: 0-14, 15-24, 25-44, 45-59 and 60 years and above, and for all ages, separately for rural and urban areas of each State and Union Territory.

Number and percentage of regular tobacco users above15 years of age

The percentage of r_2 of regular users above 15 years of age, is obtained by applying the formula.

$r = w_1 r_1 + (1-w_1) r_2$

Where w_1 is the proportion of the population below 15 years (taken from Census of India, 1981) r_1 the prevalence rate of tobacco use in the age group 0-15 years and r the overall rate of tobacco use for all ages. The number of regular users is obtained by using population figures given in Census of India, 1991.

Average number and percentage of persons of 15-25 picking up tobacco habit per year

The computations are done on the basis of the following argument:

Let $N_1(t)$ denote the population in the age group 15-24 or the time of survey and $p_1(t)$ denote the proportion of regular users in this population, giving $p_1(t)\ N_1(t)$ as the number of regular users of age 15-24 at the time of the survey. If $p_0(t-10)$ is the proportion of regular use in the age group (5-14) at time t-10, that is 10 years earlier to the present survey, then $N_1(t)\{p1(t) - p_0(t-10)\}$ gives an estimate of the number of persons among the population $N_1(t)$ who have picked up the habit in the 10-year period ending with the time of the present survey. Therefore $N_1(t)\{p_1(t)-p_0(t-10)\}/10$ is an estimate of the average number of persons of age grou 15-24 who take up tobacco habit per year and $\{p_1(t) - p_0(t-10\}/10$ is the average annual picking up rate in the age group 15-24.

However, since estimates of $p_0(t-10)$ are not available, estimates of $p_0(t)$ are used in place of $p_0(t-10)$, on the assumption that the rate $p_0(t-10)$ had not changed in the intervening period of 10 years. Also the Sarvekshana tables provide rate of regular uses in the age group 0-14 and not in the age group (5-14). The rates $p_0(t)$ have been estimated from those of age group (0-14) after multiplying these by 3/2, as there would be few regular users aged below 5 years.

Data on production of tobacco are taken from Tobacco Development Journal[2].

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Tobacco addiction amongst Scheduled Castes (SC) and Scheduled Tribes (ST) persons above 15 years

In rural areas, the percentage of regular users among men belonging to ST (67.2) and SC (61.1) were higher than the national average (55.4) for rural men. The prevalence rates of smoking habit for men were higher for ST (44.6%) and SC (45.5%) than the national rate (39.1%) of rural men. The prevalence rates of tobacco habits among women of ST (24.8%) and SC (17.9%) were higher than the national rate (16.4%) of rural women. The prevalence rates of smoking habit among women of ST (7.2%) and SC (4.8%) were higher than national rate (3.6%) of smoking among rural women.

In urban areas, the percentage of regular users among men of ST (49.4%) and SC (46.3%) were higher than the national average (36.7%) for urban men. The prevalence rates of smoking habits for men were higher for ST and SC (both equal to 36.4%) than the national average (28.1%) for urban men. The prevalence rates of tobacco habits among urban women of ST (17.9%) and SC (12.2%) were higher than the national average (8.2%) for urban women. The rates of smoking among urban women

In rural areas, the prevalence of tobacco chewing was higher for ST and SC compared to national average for both men and women. For men, the three prevalence rates were 26.1%, 19.7% and 19.3% and for women the rates were 11.6%, 9.0% and 8.1% respectively. For both men and women, the prevalence rates for snuff and burnt tobacco habits were the highest for ST, while the corresponding rates for SC were either equal or lower than the national rates.

In urban areas, the prevalence of tobacco chewing was higher for ST and SC compared to the national average for both men and women. For men, the three prevalence rates were 15.7% , 12.2% and 9.6% and for women, the rates were 8.6%,

It is thus noted that in both rural and urban areas, the prevalence of regular tobacco use among men as well as women was the highest for ST, followed by SC and the rates for these classes were higher than the corresponding rates for the rest of the population. The rates were higher for rural areas than

Addiction among children

Using burnt tobacco was the most common habit among children below 15 years in the country, with 2.18 million (0.65%) children being addicted to it. In the States having relatively high prevalence rates of tobacco habits among children, like Maharashtra, Orissa, Madhya Pradesh and Tripura, burnt tobacco was the most common habit among children. Using burnt tobacco was also the most common tobacco habit among children in the States of Karnataka, Manipur, Rajasthan and Goa, which had relatively low prevalence rates of tobacco use among children.

In the States of Andhra Pradesh, Arunachal Pradesh, Bihar, Gujarat, Haryana, Himachal Pradesh, Meghalaya, Punjab, Sikkim, Uttar Pradesh and West Bengal, and the Union Territories of Chandigarh and Lakshadweep, the most common tobacco habit among children was smoking.

In the States of Assam, Tamil Nadu, Delhi and Mizoram and in the Union Territory of Andaman and Nicobar Islands, the most common tobacco habit among children was tobacco chewing.

At the national level, among boys the prevalence rates of using burnt tobacco, smoking and chewing were 0.60%, 0.43% and 0.25% respectively. Among girls the prevalence rates of the two most common habits of using burnt tobacco and of chewing were 0.70% and 0.25% respectively.

The break-up of habits of persons above 15 years

At the national level, in rural areas 31.3 % men (of age 15+ years) had the habit of smoking only, 16.3% had smokeless tobacco habits only and 7.8% had both smoking and smokeless tobacco habits. Among rural women, 12.8% had smokeless tobacco habits only 3.3% had smoking habit only and 0.3% had both smoking and smokeless tobacco habits.

In urban areas, 24.1% men had smoking habit only, 8.6% had smokeless tobacco habits only and 4.0% had both smoking and smokeless tobacco habits; among women 7.1% had smokeless habit only, 1.0% had smoking habit only and 0.1% had both smoking and smokeless tobacco habits.

Smokeless tobacco addiction

Among rural men, 19.3% had chewing habits, 4.0% had burnt tobacco habit and 1.1% had the habit of using snuff. And among rural women, 8.1% had chewing habit, 4.6% had burnt tobacco habit and 1.3% had the habit of snuff.

Among urban men 9.6% had chewing habit, 2.0% had burnt tobacco habit and 0.6% had snuff habit. And among urban women 4.6% had chewing habit, 2.3% had burnt tobacco habit and 0.8% had snuff habit.

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INDIA

POPULATION: 844 million (1991 Census)

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No.(%)	Women No.(%)	Men No.(%)	Women No.(%)
SMOKING	74,828 (39.1)	6,573 (3.6)	20,797 (28.1)	714 (1.1)
SMOKELESS ONLY	30,140 (16.3)	23,289(12.8)	6,376 (8.6)	4,521 (7.1)
ANY FORM	**1,04,968 (55.4)**	**29,862 (16.4)**	**27,173 (36.7)**	**5,235 (8.2)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

Figures in Thousand

	RURAL No (%)	URBAN No(%)
BOYS	1,845 (1.4)	243 (0.6)
GIRLS	1,463 (1.2)	194 (0.6)
TOTAL	**3,308 (1.3)**	**437 (0.6)**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figures in Thousand

	RURAL No (%)	URBAN No (%)
MALES	1,270 (2.26)	263 (1.09)
FEMALES	264 (0.50)	42 (0.21)
TOTAL	**1,534 (1.41)**	**305 (0.67)**

AREA UNDER TOBACCO CULTIVATION IN THOUSAND HA AND PRODUCTION IN THOUSAND TONNES

	1989/90	1990-91
Area	413.1 (109.9)	410.3 (118.7)
Production	551.6 (109.4)	558.4 (113.0)

Figures in brackets for Virginia Tobacco.

India

In rural areas, 55% men and 16% women over the age of 15 years were regular users of tobacco. Among men, 39% smokers and 16% has other tobacco habits (other than smoking). Among women, 4% were somkers and 13% had other tobacco habits (other than smoking). Chewing tobacco was the most common smokeless tobacco habit among men (19.3% men were chewers) and also among women (8.1% women were chewers). **In all 105 million men and 30 million women in rural areas were regular users of tobacco.**

In urban areas, 37% men and 8% women over the age of 15 were regular users. Among men, 28% were smokers and 9% had other tobacco habits. Among women 1% were smokers and 7% had other tobacco habits. Chewing tobacco was the most common smokeless tobacco habit among men (9.6% men were chewers) and also among women (4.6% women were chewers). **In urban areas, 27 million men and 5 million women were regular users.**

In rural areas, 1.3% of children below 15 years were regular users and in urban areas 0.6% children were regular users. In all 3,745 thousand children were regular tobacco users in rural and urban areas.

Uptake of habit:

In the population aged 15-24, in rural areas, on average 2.26% males and 0.5% females had taken up tobacco habit every year. This translates into 1,534 thousand persons in rural areas taking up tobacco habit every year. In urban areas, on average 1.09% males and 0.21% females in age group 15-24, had taken up tobacco habit every year. This shows that 305 thousand persons (age 15-24) take up tobacco every year in urban areas. In rural and urban areas together on average 1,839 thousand persons of age 15-24 years take up tobacco habit per year.

Tobacco Cultivation & Production:

In 1989-90 and 1990-91 the area under tobacco cultivation was 413.1 and 410.3 thousand hectares. Of these 109.9 and 118.7 thousand hectares were under Virginia Tobacco. The production of tobacco in 1989-90 and 1990-91 was 551.6 and 558.4 thousand tonnes of which 109.4 and 113.0 thousand tonnes were of Virginia Tobacco.

ANDHRA PRADESH

POPULATION: 66.305 Million

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No. (%)	Women No. (%)	Men No. (%)	Women No. (%)
SMOKING	8,262 (55.4)	1,255 (8.5)	1,949 (33.8)	135 (2.5)
SMOKELESS ONLY	309 (2.1)	1,181 (8.0)	73 (1.3)	277 (5.2)
ANY FORM	**8,571 (57.5)**	**2,436 (16.5)**	**2,022 (35.1)**	**412 (7.7)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

Figures in Thousand

	RURAL No. (%)	URBAN No.(%)
BOYS	114.6 (1.2)	13.5 (0.4)
GIRLS	46.7 (0.5)	3.3 (0.1)
TOTAL	**161.3 (.86)**	**16.8 (.25)**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figures in Thousand

	RURAL No. (%)	URBAN No. (%)
MALES	77.1 (1.95)	17.9 (0.96)
FEMALES	22.7 (0.57)	2.2 (0.12)
TOTAL	**98.8 (1.26)**	**20.1 (0.55)**

AREA UNDER TOBACCO CULTIVATION IN THOUSAND HA AND PRODUCTION IN THOUSAND TONNES

	1989-90	**1990-91**
Area	163.5 (90.7)	166.7 (98.5)
Production	203.1 (98.8)	190.5(101.8)

Figures in bracket for Virginia Tobacco.

ANDHRA PRADESH

In rural areas, 58% men and 17% women over the age of 15 years were regular users of tobacco. Among men, 55% were smokers and 2.1% had other tobacco habits (other than smoking). Among women, 9% were smokers and 8% had other tobacco habits (other than smoking). Chewing tobacco was the most common smokeless tobacco habit among men (2.7% men were chewers) and also among women(7.0% women were chewers). **In all 8.571 million men and 2.436 million women in rural areas were regular users of tobacco.**

In urban aras, 35% men and 8% women over the age of 15 years were regular users. Among men, 34% were smokers and 1% had other tobacco habits. Among women 3% were smokers and 5% had other tobacco habits. Chewing tobacco was the most common smokeless tobacco habit among men (1.4% men were chewers) and also among women (4.6% women were chewers). **In urban areas, 2.022 million men and 412 thousand women were regular users.**

In rural areas, 0.9% of children below 15 years were regular users and in urban areas 0.3% children were regular users. **In all 178.1 thousand children were regular tobacco users in rural areas and urban areas.**

Uptake of habit:

In the population aged 15-24, in rural areas, on average 1.95% males and 0.57% females had taken up tobacco habit every year. This translates into 99.8 thousand persons in rural areas taking up tobacco habit every year. In urban areas, on average 0.96% males and 0.12% females in age group 15-24, had taken up tobacco habit every year. This shows that 20.1 thousand persons (age 15-24) take up tobacco habit every year in urban areas. In rural and urban areas together on average 119.9 thousand persons of age 15-24 years take up tobacco habit per year.

Tobacco Cultivation & Production:

In 1989-90 and 1990-91 the area under tobacco cultivation was 163.5 and 166.7 thousand hectares. Of these 90.7 and 98.5 thousand hectares were under Virginia Tobacco. The production of tobacco in 1989-90 and 1990-91 was 203.1 and 190.5 thousand tonnes of which 98.8 and 101.8 thousand tonnes were of Virginia Tobacco.

GOA

POPULATION: 1169 thousand

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No.(%)	Women NO.(%)	Men No.(%)	Women No.(%)
SMOKING	101.78 (41.6)	3.49 (1.4)	39.74 (23.0)	1.65 (1.1)
SMOKELESS ONLY	20.51 (8.4)	22.12 (8.8)	6.97 (4.0)	2.84 (1.8)
ANY FORM	**122.29 (50.0)**	**25.61 (10.2)**	**46.71 (27.0)**	**4.49 (2.29)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

Figures in Thousand

	RURAL No.(%)	**URBAN** No.(%)
BOYS	0	0
GIRLS	4.22 (3.1)	0
TOTAL	**4.22 (1.55)**	**0**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figures in Thousand

	RURAL No. (%)	**URBAN** No. (%)
MALES	1.05 (1.30)	0.13 (0.23)
FEMALES	0.03 (0.04)	0.12 (0.24)
TOTAL	**1.08 (0.69)**	**0.25 (0.23)**

GOA

In rural areas, 50% men and 10% women over the age of 15 years were regular users of tobacco. Among men, 42% were smokers and 8% had other tobacco habits (other than smoking). Among women, 1% were smokers and 9% had other tobacco habits (other than smoking).Using burnt tobacco powder/paste was the most common smokeless tobacco habit among men (10.1% men were users of burnt tobacco) and also among women (5.3% women were users of burnt tobacco). **In all 122.29 thousand men and 25.61 thousand women in rural areas were regular users of tobacco.**

In urban areas, 27% men and 3% women over the age of 15 years were regular users. Among men, 23% were smokers and 4% had other tobacco habits. Among women 1% were smokers and 2% had other tobacco habits. Chewing tobacco was the most common smokeless tobacco habit among men (4.2% men were chewers) and also among women (1.7% women were chewers). **In urban areas, 46.71 thousand men and 4.49 thousand women were regular users.**

In rural areas, 2% of children below 15 years were regular users and in urban areas, there were no regular users among children. **In all 4.22 thousand children were regular tobacco users in rural areas.**

Uptake of habit:

In the population aged 15-24, in rural areas, on average 1.3% males and 0.04% females had taken up tobacco habit every year. This translates into **1.08 thousand persons** in rural areas taking up tobacco habit every year. In urban areas, on average 0.23% males and 0.24% females in age group 15-24, had taken up tobacco habit every year. This shows that **0.25 thousand persons** (age 15-24) take up tobacco habit every year in urban areas. In rural and urban areas together on average **1.33 thousand persons** of age 15-24 years take up tobacco habit per year.

DIS-375

KARNATAKA

POPULATION: 44,817 thousand

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No.(%)	Women No.(%)	Men No.(%)	Women No.(%)
SMOKING	3,386 (35.9)	29.88 (0.3)	1,220.8 (26.6)	19.38 (0.5)
SMOKELESS ONLY	980 (10.4)	1,423.06 (15.7)	187.8 (4.1)	234.34 (5.7)
ANY FORM	**4,366 (46.4)**	**1,452.94 (16.1)**	**1,408.6 (30.7)**	**253.72 (6.2)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

Figures in Thousand

	RURAL No. (%)	**URBAN** No. (%)
BOYS	37.58 (0.6)	0
GIRLS	12.44 (0.2)	2.56 (0.01)
TOTAL	**50.02 (0.40)**	**2.56 (0.05)**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figures in Thousand

	RURAL No. (%)	**URBAN** No. (%)
MALES	33.54 (1.2)	7.59 (0.49)
FEMALES	7.81 (0.29)	1.34 (0.09)
TOTAL	**41.35 (0.75)**	**8.93 (0.30)**

AREA UNDER TOBACCO CULTIVATION IN THOUSAND HA AND PRODUCTION IN THOUSAND TONNES

	1989-90	**1990-91**
Area	50.5 (18.1)	46.1 (19.2)
Production	34.5 (9.4)	31.0 (10.1)

Figures in brackets for Virginia Tobacco.

KARNATAKA

In rural areas, 46% men and 16% women over the age of 15 years were regular users of tobacco. Among men, 36% were smokers and 10% had other tobacco habits (other than smoking). Among women, 0.3% were smokers and 16% had other tobacco habits (other than smoking). Chewing tobacco was the most common smokeless tobacco habit among men (11.4% men were chewers) and also among women (12.4% women were chewers). **In all 4.366 million men and 1.453 million women in rural areas were regular users of tobacco.**

In urban areas, 31% men and 6% women over the age of 15 years were regular users. Among women, 27% were smokers and 4% had other tobacco habits. Among women 0.5% were smokers and 6% had other tobacco habtis. Chewing tobacco was the most common smokeless tobacco habit among men (4.7% men were chewers) and also among women (4.4% women were chewers). **In urban areas, 1.409 million men and 254 thousand women were regular users.**

In rural areas, 0.40% of children below 15 years were regular users and in urban areas 0.05% children were regular users. **In all 52.57 thousand children were regular tobacco users in rural areas and urban areas.**

Uptake of habit:

In the population aged 15-24, in rural areas, on average 1.2% males and 0.29% females had taken up tobacco habit every year. This translates into **41.35 thousand persons** in rural areas taking up tobacco habit every year. In urban areas, on average 0.49% males and 0.09% females in age group 15-24, had taken up tobacco habit every year. This shows that **8.93 thousand persons** (age 15-24) take up tobacco habit every year in urban areas. In rural and urban areas together on average **50.28 thousand persons** of age 15-24 years take up tobacco habit per year.

Tobacco Cultivation & Production:

In 1989-90 and 1990-91 the area under tobacco cultivation was 50.5 and 46.1 thousand hectares. Of these 18.1 and 19.2 thousand hectares were under Virginia Tobacco. The production of tobacco in 1989-90 and 1990-91 was 34.5 and 31 thousand tonnes of which 9.4 and 10.1 thousand tonnes were of Virginia Tobacco.

KERALA

POPULATION: 29,011 thousand

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No. (%)	Women No. (%)	Men No. (%)	Women No. (%)
SMOKING	2,613 (39.4)	54.2 (0.8)	876.2 (34.9)	19.6 (0.7)
SMOKELESS ONLY	344 (5.2)	899.6 (12.6)	72.0 (2.9)	160.4 (6.1)
ANY FORM	**2,957 (44.6)**	**953.8 (13.4)**	**948.2 (37.8)**	**180.0 (6.8)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

Figures in Thousand

	RURAL No. (%)	**URBAN** No. (%)
BOYS	3.79 (0.1)	0
GIRLS	3.75 (0.1)	0
TOTAL	**7.54 (0.1)**	**0**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figures in Thousand

	RURAL No. (%)	**URBAN** No. (%)
MALES	22.63 (1.02)	5.19 (0.62)
FEMALES	0.86 (0.03)	0
TOTAL	**23.49 (0.50)**	**5.19 (0.30)**

AREA UNDER TOBACCO CULTIVATION IN THOUSAND HA AND PRODUCTION IN THOUSAND TONNES

	1989-90	**1990-91**
Area	0.4	0.4
Production	0.7	0.7

KERALA

In rural areas, 45% men and 13% women over the age of 15 years were regular users of tobacco. Among men, 39% smokers and 5% had other tobacco habits (other than smoking). Among women 0.8% were smokers and 13% had other tobacco habits (other than smoking). Chewing tobacco was the most common smokeless tobacco habit among men (7.8% men were chewers) and also among women (12.2% women were chewers). **In all 2.957 million men and 954 thousand women in rural areas were regular users of tobacco.**

In urban areas, 38% and 7% women over the age of 15 years regular users. Among men, 35% were smokers and 3% had other tobacco habits. Among women 0.7% were smokers and 6% had other tobacco habits. Chewing tobacco was the most common smokeless tobacco habit among men (4.5% men were chewers) and also among women (6% women were chewers). **In urban areas, 948 thousand men and 180 thousand women were regular users.**

In rural areas, 0.1% of children below 15 years were regular users. **In all 7.54 thousand children were regular tobacco users in rural areas. In urban areas there were no regular users among children.**

Uptake of habit:

In the population aged 15-24, in rural areas, on average 1.02% males and 0.03% females had taken up tobacco habit every year. This translates into **23.49 thousand persons** in rural areas taking up tobacco habit every year. In urban areas, on average 0.62% males and 0% females in age group 15-24, had taken up tobacco habit every year. This shows that **5.19 thousand persons** (age 15-24) take up tobacco habit every year in urban areas. In rural and urban areas together on average **28.68 thousand persons** of age 15-24 years take up tobacco habit per year.

Tobacco Cultivation & Production

In 1989-90 and 1990-91 the area under tobacco cultivation was 0.4 thousand hectares. The production of tobacco in 1989-90 and 1990-91 was 0.7 thousand tonnes.

MAHARASHTRA

POPULATION: 78.707 million

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No. (%)	Women No.(%)	Men No. (%)	Women No. (%)
SMOKING	2,904 (20.2)	119 (0.8)	1,695 (15.5)	41 (0.4)
SMOKELESS ONLY	5,625 (39.0)	5,065 (34.8)	2,067 (18.9)	1,385 (15.8)
ANY FORM	**8,529 (59.2)**	**5,184 (35.6)**	**3,762 (34.4)**	**1,426 (16.2)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

	RURAL No. (%)	**URBAN** No. (%)
BOYS	617.3 (6.3)	105.3 (1.9)
GIRLS	651.5 (6.6)	110.2 (2.1)
TOTAL	**1,268.8 (6.45)**	**215.5 (1.99)**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figure in Thousand

	RURAL No. (%)	**URBAN** No. (%)
MALES	82.72 (2.005)	37.59 (1.075)
FEMALES	46.44 (1.18)	19.88 (0.705)
TOTAL	**129.16 (1.60)**	**57.47 (0.910)**

AREA UNDER TOBACCO CULTIVATION IN THOUSAND HA AND PRODUCTION IN THOUSAND TONNES

	1989-90	**1990-91**
Area	9.2	10.1
Production	9.9	10.4

MAHARASHTRA

In rural areas, 59% men and 36% women over the age of 15 years were regular users of tobacco. Among men, 20% were smokers and 39% had other tobacco habits (other than smoking). Among women, 0.8% were smokers and 35% had other tobacco habtis (other than smoking). Chewing tobacco was the most common smokeless tobacco maong men (35.3% men were chewers) and using burnt tobacco powder/paste among women (23.8% women were users of burnt tobacco). **In all 8.529 million men and 5.184 million women in rural areas were regular users of tobacco.**

In urban areas, 34% men and 16% women over the age of 15 years were regular users. Among men, 16% were smokers and 19% had other tobacco habits. Among women 0.4% were smokers and 16% had other tobacco habits. Chewing tobacco was the most common smokeless tobacco habit among men (17.4% men were chewers) and using burnt tobacco powder/ paste among women (11% women were users of burnt tobacco). **In urban areas, 3.762 million men and 1.426 million women were regular users.**

In rural areas, 6.45% of children below 15 years were regular users and in urban areas 1.99% children were regular users. **In all 1,484.3 thousand children were regular tobacco users in rural and urban areas.**

Uptake of habit:

In the population aged 15-24, in rural areas, on average 2.005% males and 1.18% females had taken up tobacco habit every year. This translates into **129.16 thousand persons** in rural areas taking up tobacco habit every year. In urban areas, on average 1.075% males and 0.705% females in age group 15-24, had taken up tobacco habit every year. This shows that **57.47 thousand persons** (age 15-24) take up tobacco habit every year in urban areas. In rural and urban areas together on average **186.63 thousand persons** of age 15-24 years take up tobacco habit per year.

Tobacco Cultivation & Production:

In 1989-90 and 1990-91 the area under tobacco cultivation was 9.2 and 10.1 thousand hectares. The production of tobacco in 1989-90 and 1990-91 was 9.9 and 10.4 thousand tonnes.

TAMIL NADU

POPULATION: 55.638 Million

REGULAR USE OF TOBACCO

NUMBER AND PERCENTAGE OF REGULAR TOBACCO USERS ABOVE 15 YEARS

Figures in Thousand

TYPE OF HABIT	RURAL		URBAN	
	Men No. (%)	Women No. (%)	Men No. (%)	Women No. (%)
SMOKING	3,080 (25.8)	36.5 (0.3)	850.9 (25.7)	27.9 (0.5)
SMOKELESS ONLY	1,824 (15.2)	2,085.1 (17.7)	133.7 (4.1)	367.5 (6.1)
ANY FORM	**4,904 (41.0)**	**2,121.6 (18.0)**	**984.6 (29.8)**	**395.4 (6.5)**

NUMBER OF REGULAR USERS BELOW 15 YEARS

Figures in Thousand

	RURAL No. (%)	**URBAN** No. (%)
BOYS	13.2 (0.2)	6.6 (0.2)
GIRLS	19.1 (0.3)	3.2 (0.1)
TOTAL	**32.3 (0.25)**	**9.8 (0.15)**

AVERAGE NUMBER AND PERCENTAGE OF PERSONS 15-24 TAKING UP REGULAR TOBACCO HABIT PER YEAR

Figures in Thousand

	RURAL No. (%)	**URBAN** No.(%)
MALES	29.80 (0.89)	14.91 (0.76)
FEMALES	8.20 (0.25)	0.69 (0.035)
TOTAL	**38.00 (0.57)**	**15.60 (0.40)**

AREA UNDER TOBACCO CULTIVATION IN THOUSAND HA AND PRODUCTION IN THOUSAND TONNES

	1989-90	1990-91
Area	7.3	9.4
Production	9.2	11.9

TAMIL NADU

In rural areas, 41% men and 18% women over the age of 15 years were regular users of tobacco. Among men, 26% were smokers and 15% had other tobacco habits (other than smoking). Among women, 0.3% were smokers and 18% had other tobacco habits (other than smoking). Chewing tobacco was the most common smokeless tobacco habit among men (16.2% men were chewers) and also among women (16.6% women were chewers). **In all 4.904 million men and 2.121 thousand women in rural areas were regular users of tobacco.**

In urban areas, 30% men and 7% women over the age of 15 years were regular users. Among men, 26% were smokers and 4% had other tobacco habits. Among women 0.5% were smokers and 6% had other tobacco habits. Chewing tobacco was the most common smokeless tobacco habit among men (3.3% men were chewers) and also among women (5.2% women wee chewers). **In urban areas, 985 thousand men and 395 thousand women were regular users**.

In rural areas, 0.25% of children below 15 years were regular users and in urban areas 0.15% children were regular users. **In all 42.1 thousand children were regular tobacco users in rural and urban areas.**

Uptake of habit:

In the population aged 15-24, in rural areas, on average 0.89% males and 0.25% females had taken up tobacco habit every year. This translates into **38 thousand persons** in rural areas taking up tobacco habit every year. In urban areas, on average of 0.76% males and 0.035% females in age group 15-24, had taken up tobacco habit every year. This shows that **15.60 thousand persons** (age 15-24) take up tobacco habit every year in urban areas. In rural and urban areas together on average **53.6 thousand persons** of age 15-24 years take up tobacco habit per year.

Tobacco Cultivation & Production

In 1989-90 and 1990-91 the area under tobacco cultivation was 7.3 and 9.4 thousand hectares. The production of tobacco in 1989-90 and 1990-91 was 9.2 and 11.9 thousand tonnes.

Scientific update

SMOKING & DIABETES MELLITUS IN WOMEN Noninsulin-dependent diabetes mellitus is a major risk factor for cardiovascular disease and there is evidence that cigarette smoking is an important cause of cancer and coronary heart disease. But the association between cigarette smoking and the development of diabetes has not been fully explored, especially amongst women. Cigarette smoking decreases fasting insulin levels and causes a transient increase in blood glucose levels. A prospective study has been carried out using 114,247 female nurses from the Nurses' Health study. Smoking status data and disease status data were collected over a twelve year period. During the study 2333 incident cases of noninsulin-dependent diabetes mellitus were confirmed. The age-and weight-adjusted relative risk of this disease among women smoking 25 or more cigarettes a day, compared with never smokers, was 1.37. When the risk was adjusted for dietary intake, physical acitivity and alcohol intake the risk compared to never smokers was 1.42. There was also a dose-response association between number of cigarettes smoked and risk of the disease developing. The relative risk of the disease among ex-smokers was intermediate (1.10). The data in the study suggest that cigarette smoking may be an independent, modifiable risk factor for noninsulin-dependent diabetes mellitus that could be targeted for diabetes prevention.[1]

SMOKING & MACULOPATHY There are conflicting reports regarding the relationship between smoking and age-related maculopathy (staining, spotting or thickening of the retina of the eye), a major cause of blindness in the US. This association was examined in 4771 people aged 43-86 years who participated in the Beaver Dam Eye Study, Wisconsin. Data on smoking status duration of smoking and number of cigarettes smoked per day was gathered. Maculopathy status was determined by colour stereoscopic photographs of the fundus of the eye. Smoking status, pack-years smoked and current exposure to passive smoking were not associated with drusen (abnormal growth) characterstics or signs of early age-related maculopathy, except for a higher frequency of increased retinal pigment in males who had ever smoked compared with those who had never smoked. The relative odds for one form of late age-related maculopathy, exudative macular degeneration (maculopathy caused by leakage of fluid and cells), in females who were current smokers was 2.50 compared with those who were ex-smokers or never smokers; for males it was 3.25. There was no significant relation between smoking status and geographic atrophy, another form of late age-related maculopathy. These results suggest that exudative macular degeneration is associated with cigarette smoking and that different forms of macular degeneration may have different etiologies.[2]

SMOKING & ORAL HEALTH Tobacco smoking has been linked to oral cancer and a number of studies have indicated a multiplicative effect with alcohol consmption. Several studies have also suggested that smoking may be a risk factor for more common oral conditions such as tooth loss, dental caries and periodontal disease. The relationship between smoking and oral health was examined in a population of Canadian older adults using a variety of clinical indicators. Since the effects of oral disease are cumulative over time, differences between smokers and nonsmokers should generally be at their maximum in the later years of life. Data were obtained as part of the baseline phase of the Ontario Study of Oral Health of Older Adults. This is a longitudinal study of the oral health and treatment needs of persons aged 50 and over living in four Ontario communities. 907 subjects were interviewed between February 1989 and July 1990. Half of the subjects reported a history of smoking and one fifth were current smokers. Current smokers were more likely to have lost all their natural teeth than those who had never smoked. Odds ratios were 1.95 for those smoking 19 or fewer cigarettes per day and 2.57 for those smoking 20 or more per day. There was no difference in edentulism between former smokers and those who had never smoked. Periodontal indicators showed that the extent and severity of periodontal disease were more marked among current smokers when compared with those who had never smoked. Current smokers also showed a higher prevalence of mucosal disorders and needed more dental treatment. The author concludes that oral health issues need to be incorporated into health promotion programmes aimed at preventing or reducing the prevalence of smoking. Dental care providers can also be an important part of such programmes by educating patients about the effect of smoking on oral health and providing referrals to quit-smoking programmes.[3]

— **Sex differences in smoking/lung cancer risks**

A study examined the importance of cigarette smoking as a risk factor for specific histologic types of lung cancer in men and women (histology is the study of the minute structure of the tissues). A case-controlled analysis of data from the Cancer Surveillance Program (a population based registry) of Orange County, California, USA, was undertaken. Smoking habits were abstracted from medical records for 1153 men and 833 women diagnosed with primary lung cancer in 1984-86 and 1851 men and 1656 women aged 30 or older diagnosed with cancers not associated with smoking. 96% of men and 89% of women with lung cancer were current or former cigarette smokers, compared with 55% of men and 34% of women with other cancers. The results affirm the strong association between smoking and lung cancer in women as well as men. All three major cell types (squamous-cell carcinoma , small-cell carcinoma and adenocarcinoma) are significantly associated with cigarette smoking. The results suggest three patterns: first, there is little difference between men and women in the the OR (odds ratio) for all lung cancers. Second, women appear to have a steeper increase in risk with increased amount of smoking than men (the steeper risk was observed for all cell types combined and for specific cell

types). Third, men and women who smoke do not have the same likelihood of developing the different histologic types of lung cancer. While men who smoke have the same OR for squamous-cell and small-cell carcinomas, women who smoke have higher OR for developing small-cell carcinoma than for squamous-cell carcinoma. In addition, OR for small-cell carcinoma may be higher in women than in men (both squamous-cell and small-cell carcinomas of the lung are considered to be strongly associated with smoking). The study concludes that, contrary to the beliefs of several decades ago, women are not protected from the effects of smoking but may in fact be more susceptible than men to the carcinogenic effects of cigarette smoke. [4]

SMOKING & LEUKAEMIA The causes of leukaemia remain largely underdetermined, yet increased evidence suggests that certain forms of adult leukaemia (most notably myeloid and acute nonlymphocytic varieties) may be related to cigarette smoking. A meta-analysis (ie, a systematic, quantitative review to ascertain causal or associative relationships between risk facrtors, using data from several studies to achieve a quantitative summary risk estimate) was undertaken of available studies. The authors used their own knowledge of ongoing and unpublished sutides and data identified through a Mediline search for the period 1970 through to 1992. The meta-analysis included seven prospective studies and eight case-control studies. The US Surgeon General's criteria were used to assess the evidence for causality. A positive association between smoking and certain histologic types of leukaemia was found in both prospective and case-control studies. Every study except one identified an elevated risk of leukaemia due to smoking for most cell type/sex subgroups. The majority of prospective studies found a dose-response relationship between the level of smoking (measured in cigarettes per day) and leukaemia risk. Among prospective studies that reported findings by histologic types, risk elevations were usually largest for myeloid leukaemia. Results by histologic type suggested that the largest increase in risk was for ANLL (acute nonlymphocytic leukaemia). The only consistent dose-response relationship was shown for ANLL. Risk of leukaemia increased according to the number of cigarettes smoked per day. Population-attributable risk calculations suggested that approximately 14% of all US leukaemia cases (including 17% of myeloid and 14% of acute nonlymphocytic leukaemias) may be due to cigarette smoking. The authors conclude that their meta-analysis of research provides substantial evidence of a positive association between cigarette smoking and certain forms of adult leukaemia. They note that further studies are needed to examine risk among women, dose-response effects, and variation in risk by histilogic type. [5]

Adapted from IATH bulletin.

1. Rimm, EB, Manson, JE, et al. Cigarette smoking and the risk of diabetes in women. American Journal of Public Health February 1993; **83**(2): 211-214. [ASH]

2. Klein, R, Klein, BE et al. The Beaver Dam Eye Study: the relation of age-related maculopathy to smoking. American Journal of Epidemiology 1993; 137(2): 190-200. [ASH]

3. Locker, D. Smoking and oral health in older adults. Canadian J Public Health 1992;**83**: 429-432. [ASH]

4. Osann, KE et al. Sex differences in lung-cancer risk associated with cigarette smoking. Int J Cancer 1993; **54**: 44-48

5. Brownson, RC; Novotny, TE; Perry, MC Cigarette smoking and adult leukaemia. Arch Intern Med 1993; **153**: 469-475

NEWS ANALYSIS

Phillies win the World Series... of tobacco spitting

The Phils' Lenny Dykstra unleashes another brown torrent of tobacco juice! Let's see that on instant replay!...
Your nausea will subside when the World Series ends..
Mike Luckovich

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Yes, the Toronto Blue Jays won the 1993 World Series in baseball. But according to *Newsday* (Long Island, New York) the Philadelphia Phillies won the 1993 World Series of Tobacco Spitting – by a landslide. During that October week, the newspaper's sports section ran a "Chaw Talk" scoreboard, which on a daily basis tallied the number of spit tobacco sightings captured by television cameras during the Series. At the end of the event, the Phillies led the Blue Jays in each of three categories: tobacco spitting, open-mouth chewing, and "cud sightings" (figure 1).

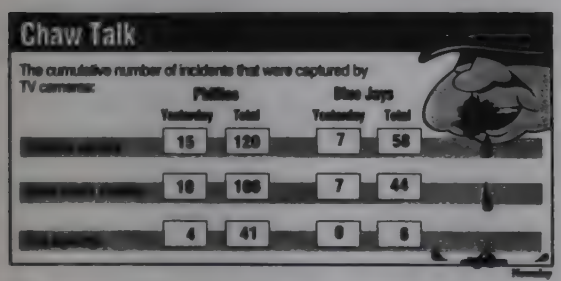

Figure 1 Tabulation of spit-tobacco sightings on television during the 1993 World Series, by Newsday *(21 October 1993).*

Long Island (New York) Newsday

Figure 2 Philadelphia Phillies' star spitter Lenny Dykstra.

For three days, spitting images of Phillies youth hero Lenny Dykstra (figure 2) and Toronto Blue Jay Paul Molitor graced *Newsday*'s sports page. A full-page article in the newspaper's 20 October edition reported that spitting tobacco use has increased eight-fold for players under 20 since the 1970s.

In some ways, smokeless tobacco use among baseball players is understandable. After all, the game requires standing in the outfield in the parched sun waiting for a ball to fly by, and sitting in the dugout for much of the afternoon with nothing to do. The players have told *Newsday* reporter David Behrens that they mostly chew gum and spit sunflower seeds to pass the time, but a recent article (*Am J Public Health* 1992; **82**: 417–21) reported that 45% of Major and Minor League players use spit tobacco.

Thirty-year-old Phillies star centerfielder Lenny Dykstra – affectionately known as "Dude", "Nails", and by one sportswriter, "Pigpen" – has not been deterred by talk of the dangers of smokeless tobacco use. Dykstra may have quit other risky behaviours (gambling, after being placed on probation; and drunk driving, after a May 1991 car crash nearly fatal to both himself and teammate Darren Daulton). However, "the most intelligent hitter in baseball" (*Philadelphia Inquirer*, 22 October 1993) still smokes cigarettes and piles "relaxing" Red Man Chew into his mouth.

In game two of the Series, Dykstra *swallowed* a wad of chew, after which he hit a home run. Does he know that Babe Ruth, a heavy user of snuff, chew, and cigars, died at age 53 from throat cancer? Did Dykstra miss the March 1993 visit to his team's clubhouse by a cancer victim, half of whose jaw and tongue had been cut away because of chewing tobacco? Lenny's teammate, pitcher Terry Mulholland, didn't; a snuff dipper for 17 years, Mulholland quit on the spot (*Philadelphia Inquirer*, 20 October 1993).

Besides being a Phillies' trademark, spitting is even a topic of research at the Baseball Hall of Fame in Cooperstown, New York. Researcher Bill Deane places the onset of baseball's spitting tradition at the late 19th century when the game, originally the province of the gentlemen elite, became a money-making professional sport.

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Many of the baseball greats, such as Nellie Fox of the Chicago White Sox and Don Zimmer, now coach of the Colorado Rockies, were noted for the big lumps in their cheeks. In fact, Major League teams once supplied free chewing tobacco to their players. During the 1980s, although players' smoking and tobacco chewing decreased, their use of moist snuff increased, thanks to an aggressive industry marketing campaign which delivered free samples to team clubhouses (*Am J Public Health* 1992; **82**: 351–3). As veteran Mets pitcher Jeff Inness, a recent convert to gum chewing, told *Newsday*: "It [spitting tobacco] is something from childhood. You pick it up imitating the pros when you're a kid."

Baseball officials and health authorities are trying to send the message to these role models that spitting tobacco is not only gross but very dangerous. Effective 15 June 1993, Major League Baseball prohibited smoking or spit tobacco use by Minor League players, coaches, and umpires anywhere in their ball parks or on team buses. Being unionised, however, Major League players are not affected by the ban; the issue is negotiable under their collective bargaining agreement. How ironic that the home stadiums of both the Phillies (incidentally, named after the cigar with the same name) and the Blue Jays are smoke-free. For now, unfortunately, they certainly are not tobacco spit-free.

ELLEN ILANA PERLOW
SmokeFree Educational Services, New York, NY, USA

The "expertise gap" – another reason why voluntary agreements fail

"SMALL EARTHQUAKE IN CHILE: NO CASUALTIES" is said to have been the winning entry in a private competition among newspaper journalists to see who could get the most boring headline past the editor. Those of us who report developments in tobacco control have been subjected to quite a blizzard of possible contenders in our own field of interest over the past year, as more weak and naïve governments are enticed by the tobacco companies to opt for self-regulation agreements as an alternative to legislation. Perhaps the most pathetic aspect is not the lack of effectiveness of the regulations being announced (see *Tobacco Control* 1993; 2: 183–4), but the pitiful faith of the governments announcing them. Ground down by months of tough negotiations and brain-washed by industry propaganda, they actually seem to expect praise for opting not to play for the health side, making themselves the referees instead, and then announcing a draw under rules dictated by the opponents.

One of the many advantages to the tobacco industry of voluntary agreements with governments is that health ministries have no expertise in any of the vital areas – communications, typography, graphic design. In many cases, not a single government official even seems aware that these important areas of expertise exist. The industry, on the other hand, has the resources and the knowledge to use the best expertise that money can buy. The result is that once the idea of voluntary agreements is accepted, the industry can direct the development of regulations that will preserve the maximum possible effectiveness of its advertising, while making the government think it has achieved a major step forward in public health policy.

This "expertise gap" is well illustrated by a little saga from Canada. Unusually, it has a happy ending. In 1988, while the government was pressing for an immediate ban on tobacco billboard ads, the desperate tobacco and billboard lobbies managed to extract a concessionary three-year phase-out period instead. During negotiations, the Non-Smokers' Rights Association (NSRA) Legal Counsel David Sweanor managed to ensure that the billboards would carry health messages as prescribed by regulation. The industry proposed that billboards should carry a very detailed message in both French and English (some 65 words in total) covering the bottom 10% of billboards. Government officials were initially impressed, but fortunately NSRA had done its homework and was able to use the opponents' own materials against them. NSRA produced a manual published by Mediacom, Canada's largest outdoor advertising company, explaining some of their trade's dark secrets to potential advertisers:

> "Size is important. Lettering of 4 inches [10.2 cm] or less becomes a smudge at 200 feet. Unimportant statements can be printed at 4 inches or less. This guarantees that no one will be able to read them!"

NSRA also produced a sight chart diagram used by Mediacom, showing how the lettering size put forward by the industry would guarantee illegibility from normal viewing distances. This, together with evidence showing how the bottom portion of billboard ads is often visually obscured by bushes, or by the platforms used by maintenance personnel, turned the tide. The result was a shorter message ("Smoking causes lung cancer, emphysema and heart disease") only in the language of the ad itself, in a space occupying 20% at the *top* of the billboard. After considering these rules, with the help of at least one mock-up, the industry decided to stop any further billboard advertising. Clearly, cigarette manufacturers prefer to avoid informing the public rather than risk communicating any effective health message. – DS

Laos – "the land of smiles" (and smokes)

As the muddy waters of the Mekong river swirled by, thousands of Laotians gathered on the dusty banks to celebrate an annual rowing race in the heart of rural Laos. However, there was one extra boat on the river, attractively painted and strikingly different from all the other long-boats filled with teams of rowers. This motorised boat paraded up and down all day in front of the large and noisy holiday crowd, holding aloft a huge banner in striking red and white colours. Occasionally it came to shore at the point where stylish red and white umbrellas shielded the privileged from the penetrating sun. Sometimes it would ride alongside its own racing boat, whose young rowers all wore the fashionable t-shirts emblazoned with the internationally famous cigarette colours and logo, unlike many of the other teams that were dressed in old, sometimes ragged, t-shirts.

A gleaming red and white van, emblazoned with cigarette name, is hard to miss as it darts along the streets of downtown Vientiane. It starts from smart offices, instantly recognisable by the red and white plastic signs outside, and delivers its goods to its sales outlets. Even deep in the rural countryside, reachable only by dirt track, large Marlboro cowboy posters dominate village stores.

Laos, bordered by China, Vietnam, Cambodia, Thailand, and Myanmar, is ranked one of the poorest countries in the world. Laos is mostly rugged mountains, dense jungle and plateau, except along the lower reaches of the Mekong river. The population is only 4.2 million people, of whom 85 % live in rural and often very remote areas.

Life expectancy is 51 years, and the main causes of death are still malaria, respiratory infections, and infant diarrhoea, but a new epidemic has arrived – "the brown plague".

Data on tobacco

No accurate figures are available, but it is estimated that 60 % of adult males smoke, although few women do so. Among certain minority groups the prevalence rates for both men and women are thought to be as high as 70 % to 90 %. Rural people use cigarette smoke to repel mosquitoes, a factor to be taken into consideration in a country whose leading cause of death is malaria.

Today, the health problems of tobacco use are insignificant compared with those caused by infectious diseases. While tobacco-related deaths among today's adults are more difficult to predict because of unknown past variables, the impact on Laotian children and teenagers in the future is more predictable. Professor Richard Peto of Oxford University has estimated that 200 000 of the two million children and teenagers alive today in Laos will eventually die from tobacco use (as with other developing countries – if present smoking patterns continue, if the cigarettes smoked are manufactured cigarettes, if the pattern follows that of western countries, and as other diseases decrease). Most of these deaths will be among males, but if smoking increases among females in the future, then the prediction would be much worse.

Tobacco industry

Most tobacco is grown for local consumption. There is only one cigarette factory, owned by Thais. The American and British tobacco companies are already penetrating the country with sophisticated advertising and sponsorship, never seen before in Laos. Posters for Marlboro and 555 brands are everywhere, even in remote villages. The Lao national sports team was recently sponsored by a cigarette company to participate in the (smoke-free) South East Asian Games in Singapore, and sponsorship of popular boat racing teams by Marlboro and 555 is common in Laos.

Tobacco control activities

As in many developing countries, awareness of the harmfulness of tobacco has only evolved very recently, and up to now there has been no national policy on tobacco. World No Tobacco Day was celebrated on 31 May 1993, some posters have been produced, and the harmfulness of tobacco has occasionally been featured in television spots on health.

There is still no tobacco control legislation, although in the summer of 1993 the Ministry of Health was successful in requiring Philip Morris to remove a large Marlboro advertisement from the first tobacco advertising billboard to be erected in Vientiane. In August 1993 the health ministry proposed guidelines on forbidding tobacco advertisements (these guidelines are rather vague, and are not yet implemented).

There are some voluntary measures to restrict smoking in hospitals, public transport (eg, all domestic air flights under one hour), theatres, cinemas, places of work, and some government premises, but these measures are just beginning.

Activities accelerated in mid-1993, when the Vice Minister of Health fortuitously visited Thailand on other matters, but had discussions with the Thai Ministry of Health about tobacco control (luckily Thailand and Singapore have the best tobacco control programmes in Asia). In 1993 the Ministry of Health established a joint Ministry/Non-Governmental Organisation Committee to cooperate with the International Union Against Cancer (UICC) in planning a November 1993 meeting on tobacco or health in Vientiane. This Committee is expected to continue in existence to further tobacco control action.

Meeting in Vientiane, 10–11 November 1993

The conference was attended by 40 key officials from the Ministry of Health, the medical school, and the

Anti-Tuberculosis Centre, as well as three regional delegates (two representing the UICC), and the World Health Organisation (WHO).

The meeting was opened by the Vice Minister of Health, Dr Rasmy Khamphay, who spoke of the many health problems his country faced. He commented on the difficulties for a country like Laos in dealing with the tobacco industry, and of tackling such a new style of epidemic.

One of us (JM), serving as the regional chair of the UICC Tobacco and Cancer Programme, noted that the meeting was timely, given the penetration of the foreign tobacco companies, and also given the future impact of tobacco on the health and the economy in Laos. Dr Francois Canonne, the WHO representative in Laos, noted that the Lao tradition has been to encourage or at least to facilitate tobacco smoking by women and, even more surprisingly, by children as young as five or six years old in the minority groups.

The delegates showed intense interest in the topics presented by the three regional delegates, particularly in national tobacco control programmes, especially legislation; in the economic costs of tobacco; in health education; and specifically in the Thai experience (Thailand borders Laos and the written and spoken languages are very similar). For most of them, the information was totally new. The delegates from Laos mainly presented global information, as there are as yet few data from Laos itself; for example, there has not yet been a smoking prevalence survey.

It was an active meeting, and the debate was extremely lively. The conference ended with resolutions, calling for health education, establishment of a national coordinating agency on tobacco control, and adoption of a national tobacco control policy, including appropriate tobacco price policy and (especially and urgently) a ban on advertising and promotion. The meeting was shown on national television, and the resolutions were disseminated in full on national radio, the widest public prominence given to smoking to date.

This small national conference is a typical example of many such meetings taking place in the Asia Pacific region, among countries that have little awareness of, or experience in dealing with, the tobacco epidemic. With minimal funding, and with only a few foreign experts, national awareness on tobacco can be raised, expertise and experience shared, and assistance given to establish and implement national tobacco control policies.

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It's a legal product

"IT'S A LEGAL PRODUCT..." – how often do we hear this plea for tobacco, cited as the definitive, incontestable argument in favour of its continued promotion? A ban would not only be an unacceptable infringement of freedom of speech, argue its opponents, but also, for a legal product, it would be illogical and wrong. Tobacco control advocates in Britain have certainly had to sit through more than their fair share of performances of this tired refrain in recent years. It is, of course, a tobacco industry argument, but the British government's cosy relationship with the industry allows it ready access to the industry's rhetoric. Much use has been made of the arrangement in the government's many efforts to wreck the chances of the European Directive on tobacco advertising becoming law. Unfortunately, last December the industry's friend shot itself in the foot. Badly.

The UK Ministry of Agriculture, Fisheries and Food announced a proposal to ban advertising of manufactured baby milk, except to health professionals. It even tried to get a ban written into two European Directives on infant formula and follow-on formula, in accordance with the World Health Organisation's International Code of Marketing of Breastmilk Substitutes. Having succeeded only in getting a permissive power for member states to introduce bans, it decided to go ahead with its own ban anyway. Where did the poor folks at Nestlés go wrong? – DS

Not so Kool

An increasingly common tactic of the tobacco industry in its desperate search for respectability is to try to create goodwill by associating with some of the most deserving but least recognised areas of human activity, especially among minority groups and in pioneering social programmes. Much less common is for someone offered an award under such a scheme to take a stand of principle. Special congratulations, then, to Ronald Johnson, a former gang member now working in a US government gang prevention programme, who refused an award sponsored by the Kool cigarette brand of BAT's US subsidiary Brown & Williamson, which would have given US$5000 to the charity of his choice. Only 14 community activists across the USA were chosen to receive the "Kool Achiever" award last September.

Johnson declined the prize at the awards ceremony in front of a stunned audience of 150, citing nicotine addiction and the drug culture as having turned into a "war on black men... Each year, America jails more black men than does the Union of South Africa. Most of those brothers are in jail for economic crimes... related to doing drugs or selling drugs." He called nicotine the "number one most addictive drug on the planet", and the audience at the ceremony gave him a standing ovation.

In an interview, Johnson explained his decision: "I decided to use my short time under the spotlight to protest against the madness in this community... For all the children who will start smoking this year, for all the Americans who would die of throat and lung cancer, I declined."

Brown & Williamson said later that Johnson had been stripped of his "Kool Achiever" award. A spokesperson for the company said, "It is unfortunate, but we will respect his wishes." Johnson's decision received support in a *Milwaukee Journal* editorial, which ran the following comment: "If Brown & Williamson wants to spotlight community achievers, fine. It would be even finer if this company and the rest of the tobacco industry stopped blanketing inner cities with billboard advertisements for cigarettes. Best of all would be an end to cigarette ads aimed specifically at young people. Kudos to Ronald Johnson, meanwhile, for jabbing at the corporate conscience." – DS

Regicide

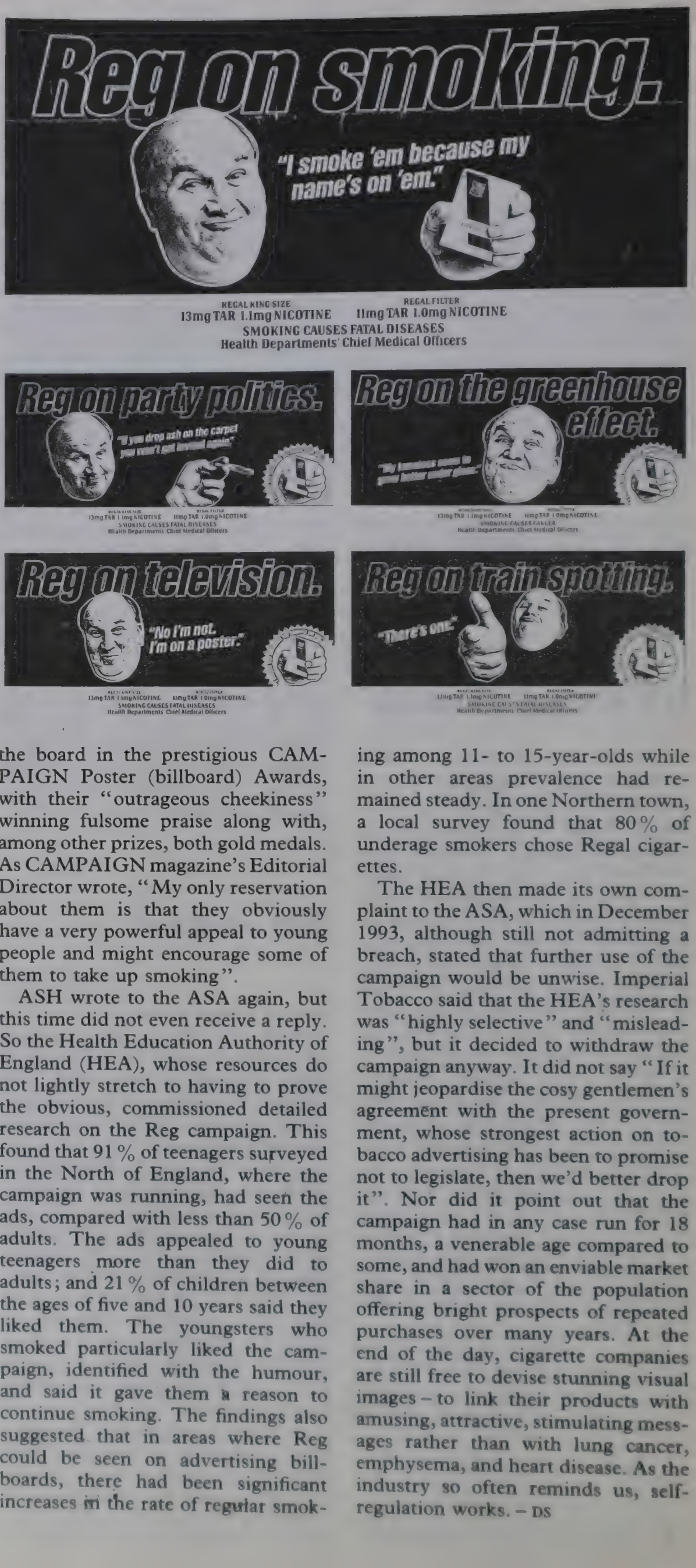
Many would regard the withdrawal of a cigarette advertising campaign found to be especially effective with children as a victory for health, as when a reluctant Imperial Tobacco, a major UK cigarette manufacturer, announced the end of a much-lauded campaign for its Regal brand. While health had won a skirmish, overall, the whole sorry saga can be seen as valuable service by the insidious "voluntary agreement" (self-regulation) system of advertising controls, whose continuance is so passionately championed by the tobacco manufacturers in their war against public health.

In the USA, where cartoon figures play a big part in children's popular culture, the development of characters like Joe Camel and Kool's Willy the Penguin by cigarette companies is of particular concern (see *Tobacco Control* 1992; **2**: 132–3). In the UK, a different but no less effective approach has emerged, using the sort of obvious jokes and simple wordplay with which British children make their peers laugh in the playground and their parents and teachers groan at home and in school. The Embassy brand has been employing a corny joke series of "Tips" with hand-drawn images reminiscent of small ads of the 1930s. Benson and Hedges has been showing strange images as clues for crossword-type questions. And Regal went one better by developing, on a regional test basis, a potential cult hero of the classic irreverence and preposterousness which British children love. Reg ("I smoke 'em because my name's on the packet", a claim also made in some ads by Reg's toupé-wearing twin brother, Al), was a comical, balding, middle-aged man who made terrible jokes.

Seeing their obvious appeal to youth, Action on Smoking and Health (ASH) wrote to the UK's Advertising Standards Authority (ASA) in July 1982, complaining that the ads clearly breached several of the rules which are supposed to govern cigarette advertising, particularly those proscribing ads likely to appeal more to children than to the public as a whole. The authority which clears all cigarette ads in the UK before they are published, replied that it had carefully assessed each ad and saw no evidence that they were acquiring any cult following. It refused to investigate further.

Three months later, the ads swept the board in the prestigious CAMPAIGN Poster (billboard) Awards, with their "outrageous cheekiness" winning fulsome praise along with, among other prizes, both gold medals. As CAMPAIGN magazine's Editorial Director wrote, "My only reservation about them is that they obviously have a very powerful appeal to young people and might encourage some of them to take up smoking".

ASH wrote to the ASA again, but this time did not even receive a reply. So the Health Education Authority of England (HEA), whose resources do not lightly stretch to having to prove the obvious, commissioned detailed research on the Reg campaign. This found that 91% of teenagers surveyed in the North of England, where the campaign was running, had seen the ads, compared with less than 50% of adults. The ads appealed to young teenagers more than they did to adults; and 21% of children between the ages of five and 10 years said they liked them. The youngsters who smoked particularly liked the campaign, identified with the humour, and said it gave them a reason to continue smoking. The findings also suggested that in areas where Reg could be seen on advertising billboards, there had been significant increases in the rate of regular smoking among 11- to 15-year-olds while in other areas prevalence had remained steady. In one Northern town, a local survey found that 80% of underage smokers chose Regal cigarettes.


Reg on smoking.
"I smoke 'em because my name's on 'em."
REGAL KING SIZE
13mg TAR 1.1mg NICOTINE
REGAL FILTER
11mg TAR 1.0mg NICOTINE
SMOKING CAUSES FATAL DISEASES
Health Departments' Chief Medical Officers
Reg on party politics.
Reg on the greenhouse effect.
Reg on television.
"No I'm not. I'm on a poster."
Reg on train spotting.
"There's one."

The HEA then made its own complaint to the ASA, which in December 1993, although still not admitting a breach, stated that further use of the campaign would be unwise. Imperial Tobacco said that the HEA's research was "highly selective" and "misleading", but it decided to withdraw the campaign anyway. It did not say "If it might jeopardise the cosy gentlemen's agreement with the present government, whose strongest action on tobacco advertising has been to promise not to legislate, then we'd better drop it". Nor did it point out that the campaign had in any case run for 18 months, a venerable age compared to some, and had won an enviable market share in a sector of the population offering bright prospects of repeated purchases over many years. At the end of the day, cigarette companies are still free to devise stunning visual images – to link their products with amusing, attractive, stimulating messages rather than with lung cancer, emphysema, and heart disease. As the industry so often reminds us, self-regulation works. – DS

Inspiration in the Caribbean

One of the architectural gems on Barbados, the Eastern-most island in the Caribbean (166 square miles, population 265000) is the Bridgetown Synagogue, built in 1833. Its congregation dates to the mid-1600s when the island's early Jewish traders are said to have helped introduce sugar cane and diversify the economy from one largely dependent on tobacco.

By the turn of the 20th century, the Jewish community had all but vanished and the synagogue, having fallen into disuse, was sold and converted into law offices. In the 1980s the synagogue was about to be destroyed by the government to build a new courthouse when it was sold to a group led by realtor Paul Altman, whose family has lived on Barbados for generations. Altman undertook a costly and meticulous restoration effort that has recreated one of the most beautiful sanctuaries in the world – and one which is supported each Sabbath by a resurgent Bajan (as natives of Barbados are called) Jewish congregation, joined by tourists from all over the world.

During the past decade, another Bajan hero has emerged, this time in the field of tobacco control. Dr Tony Gale, 71, a robust, recently retired, general practitioner, has single-handedly sparked island-wide public awareness of the serious problems caused by smoking (figure 1). A member of one of Barbados' leading families (a grandfather founded one of the two daily newspapers), Dr Gale received his medical training in Canada and the United Kingdom. Actively involved in the Barbados Cancer Society since its founding in 1981, Dr Gale has served on its council since 1985 and has led its anti-smoking campaign.

Dr Gale takes a highly motivational, skills-based approach to tobacco control. "I've concluded after several years of running smoking cessation programmes that the use of nicotine chewing gum or the nicotine skin patch is unnecessary and is unlikely to be successful in accomplishing long-term abstinence from tobacco smoking," he has written in a local publication. "Education which changes smokers' beliefs, attitudes and behaviour through accurate information about the physical, psychological and social aspects of tobacco smoking is far more likely to have the successful outcome desired by smokers and their doctors."

Figure 1 Dr Tony Gale

As in all too many countries, organised medicine is lagging sorely behind. Referring to the 200-member Barbados Association of Medical Practitioners, Dr Gale says "They've been vocal on AIDS – they have a committe that issues statements – but they do nothing on smoking." He has been able to publish only one article in the association's semi-annual bulletin and has been invited to give a solitary address at its semi-annual continuing medical education conference. "I had difficulty in getting to speak for eight minutes three or four years ago," he told me during a visit to his modest home overlooking the Caribbean Sea in 1993.

When he began conducting smoking cessation classes, he wrote to every member of the medical, dental, and nursing professions, as well as to the heart foundation. The response was hardly overwhelming, but he has since gained the support of the senior pediatrician at the island's venerable Queen Elizabeth Hospital, the former head of the military reserves, at least one governmental health official, and an Adventist minister who has co-ordinated pan-Caribbean conferences on drug and alcohol dependence. By and large, the Health Ministry and the government in general have been lackadaisical, but he did receive acknowledgement of one letter from the Attorney General.

On the whole, Gale believes that the general public has responded favourably to his campaign to ban smoking in the hospital. "The only people who've gotten really angry have been the odd doctor who smokes," he says. He cites one surgeon and one geriatrician who openly flaunt the smoking ban. As for the Pan American Health Organisation (PAHO), "they have a position on it, but the local director is rumored to smoke."

"Some years ago tourist interests helped get rid of billboards," Gale pointed out, but small shop signs for cigarette brands are ubiquitous and signs for duty-free cartons of Benson & Hedges are the first thing one sees at the airport. Ten-packs of British American Tobacco's (BAT's) Embassy and 555 brands are big sellers in the tiny shops that proliferate throughout the island. Marlboro is the most popular American brand and Marlboro logos appear above the headlines in the sports pages of the most widely circulated regional weekly newspaper, *Caribbean Week* (figure 2).

Although overt cigarette advertising has long since been withdrawn voluntarily from television by BAT, I watched four hours of a test cricket match between the West Indies and Australia live from Perth, during which Benson & Hedges logos provided a virtually continuous, in-focus backdrop to the action.

"Some test cricketers have happened on TV to talk about getting exercise and eating the right food – but never smoking," notes Dr Gale.

In addition to cricket, the tobacco industry funds art exhibits, horse shows, and other cultural activities. Dr Gale tells of a tobacco company executive, a former Boy Scout, who regularly gave $1000 a year of the company's money to the Scouts but asked that its source not be identified.

A tireless polemicist whose letters frequently appear in local newspapers and whose earnest smoking cessation messages are shown daily on the national television channel, CBC, Dr Gale expresses cautious optimism over the recent reduction in the number of employees at the BAT factory (approximately 100) and the increasing restrictions on smoking in the workplace, including one of the shipping and trading companies that transports tobacco.

Figure 2 Sports page banner of Caribbean Week

The 1992 Report of the PAHO, *Tobacco or Health: Status in the Americas*, is a valiant attempt to provide a comprehensive, nation-by-nation review of tobacco control activities. Its excellent chapter on Barbados concludes optimistically "Barbados is well situated to prevent additional chronic diseases caused by tobacco through coordinated educational, regulatory, advocacy, and research programs. The small size of the country, the high literacy rate, and the relative affluence of the population provide an encouraging setting in which to prevent diseases associated with tobacco."

With all due respect to the Barbados Ministry of Health, efforts to counteract tobacco use were not very apparent during the week I visited the country. Based on similar descriptions in the PAHO report of anti-tobacco strategies in other Latin American and Caribbean nations, I would surmise, sadly, that any suggestion of serious tobacco control activities in the region is premature.

In spite of all we have learned from the world conferences on smoking, it is still generally assumed that each country must learn to deal with its tobacco problem largely within its own political, economic, and cultural contexts. Yet this is how transnational conglomerates like BAT and Philip Morris have exploited consumer markets in Barbados and every other Caribbean (and Polynesian) island nation. Satellite telecasts of cigarette-sponsored cricket matches are merely glaring examples of the ways in which tobacco companies remain well ahead of local and national tobacco control activities, even in countries where televised tobacco advertisements are banned.

Walking along a moonlit road past tiny chattel houses abuzz with after-dinner conversation, I heard the voice of Dr Gale echoing everywhere. He was appearing in a TV commercial urging viewers to enroll in the Barbados Cancer Society's stop-smoking classes.

His voice was calm and sincere, with hardly a trace of finger-wagging ("I needn't tell you what smoking can do"), and above all encouraging that stopping smoking is not as difficult as it may at first seem.

Dr Gale is currently creating a new video and a series of TV commercials for schools and is attempting to establish a consortium of tobacco control activities throughout the Caribbean, but raising funds for a non-governmental public service project is a tough assignment, especially in times of recession. He recently wrote to me, "I would be grateful if you could recommend any funding or other international funding agencies that might consider our project worthy of support." (Address: Dr Tony Gale, PO Box 1060, GPO, Bridgetown, Barbados.)

If there is to be any hope whatsoever of diminishing the omnipresence of the tobacco industry in Latin America and the Caribbean, then common sense dictates that counter-advertising strategies be instituted via satellite television. Cultural and ethnic targeting (the basis for much wasteful and redundant market research on the part of all too many individuals and organisations engaging in tobacco control) pales into insignificance when one considers the popularity of American and British films, television programmes, sports and show business stars, and product brand names and logos throughout the world.

An international satellite TV counteradvertising approach to undermine tobacco marketing could begin to provide positive reinforcement for respected local mavericks such as Dr Tony Gale. Like the preservation of the tiny Barbados synagogue by Paul Altman, the saving of Bajan lives by Dr Gale (and the Dr Gales of other island populations) is an effort that deserves public recognition and support.

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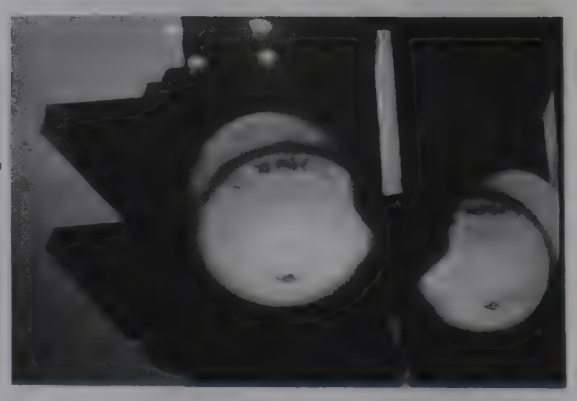
Camel lights

Bucharest, capital city of Romania, is afflicted with one of the most audacious cigarette promotions by a Western tobacco transnational company yet seen in the newly opened markets of Central and Eastern Europe. The amber filters of many of the city's traffic lights advertise the Camel brand (see figure 1).

This promotion brings to mind similar roadway promotions we've seen, such as the Marlboro name and colours on street-name and highway distance signs in the Dominican Republic (see figure 2, and article in *JAMA* 1986; 255: 993). – DS



Toxicomanies Cooperation

Figure 1 Bucharest, Romania, 1993

Ronald M Davis

Figure 2 Dominican Republic, 1985

Ideas and items for News Analysis should be sent to David Simpson at the address given on the inside front cover.

Paris and beyond

Good news and bad – that was a constant if unspoken theme of the 9th World Conference on Tobacco and Health, which took place in Paris, France from 10 to 14 October 1994. Foremost on the bad side were the World Health Organisation (WHO) forecasts of global mortality from tobacco, the main reason for the existence of the conference. There will be about 10 million premature deaths annually by the year 2025, of which seven million will be in the developing countries, the delayed result of their present, rapidly increasing consumption. These estimates may well be conservative. The recently published 40-year follow-up report of the pioneering British doctors study shows that about twice as many smokers are killed by cigarettes as was previously thought: about a half of all smokers die prematurely from smoking-attributable diseases, with the average loss of life among smokers being about eight years.

Ronald M Davis

Two children enter a Marlboro-sponsored car at a Formula One children's ride in Paris (near the Forum des Halles), site of the 9th World Conference on Tobacco and Health. Winston and Camel stickers adorned other cars

Incursions by the transnationals

Equally depressing was the record level of tobacco industry aggression that is the main cause of this increase, and which was relayed to conference delegates perhaps more vividly than ever before. As one speaker from the former Soviet Union pointed out, whereas the transnational tobacco companies (TTCs) seemed to have a special focus on South America in the 1970s and on Asia in the 1980s, it is now the turn of Central and Eastern Europe. Countries thirsty for democracy are especially susceptible to the tobacco industry's abuse of the concept of freedom by which it defends its right to promote cigarettes; these countries overlook the fact that many of the world's most stringent tobacco control policies are to be found in some of the strongest democracies.

Control of tobacco trade in the region by the TTCs has shot from 3% to about 70% in the last few years. An already massive burden of disease, with half of the deaths in middle-aged men in the region caused by smoking, seems likely to worsen before it improves, as smoking patterns follow western trends, with women catching up in the mortality tables and initiation taking place at younger ages. A Slovenian member of parliament reported how a tobacco industry representative had claimed that diminishing sales in the West were no problem – for every customer lost there, another could be found in the East.

Throughout the developing world, the marketing tactics of the TTCs are increasingly sophisticated, as delegates were constantly reminded. Promotional activities draw on the many creative ways devised to circumvent incomplete advertising controls in the industrialised world. And as their operations expand, previously quiet, "domestic" national monopolies are beginning to copy their marketing and lobbying tactics. A recent interview with the chairman of SEITA, the French national tobacco company, reported in the innovative daily newspaper for conference delegates, clearly showed the company's ambitions for expansion in Africa, the Middle East, Asia, and Central and Eastern Europe.

Signs of progress

While none of this was new to most conference delegates, the presentation of so much bad news in such a concentrated form could have sent them home with little hope. Certainly, there are few signs of an immediate sharp upturn in the fortunes of international tobacco control, yet amid all the gloom there is still much cause for encouragement. A convenient point for comparison might be the 4th world conference in 1979 in Stockholm, Sweden, the last time the meeting was held in the European region. In the intervening decade and a half, some extraordinary progress has been made. The Paris conference attendance figures themselves attest to this: compared with a few hundred in Stockholm, over 1200 delegates came to Paris; and compared to a mere handful of developing country representatives, and a few token non-western Europeans, Paris was host to about 220 people from developing countries.

Ronald M Davis

A store-front display for Marlboro clothes in Paris (in the Latin Quarter). Cigarette advertising is banned in France

These delegates from the countries with the biggest problems and the least resources were not only there in greater numbers than ever before, but they were highly active. Notable was a record number of African delegates, fresh from the first all-African tobacco control conference (see *BMJ* 1994; **308**: 189–91) and a more recent follow-up meeting to organise an African tobacco control commission. Among the star performers were the three journalists whose work on tobacco and agriculture was reported in the last issue of *Tobacco Control* (1994; **3**: 248–56). This illustrates dramatically that on questions of economics and the environment (the former being especially influential with African governments), the TTCs are no more to be trusted than they are on matters of health. The end of South African apartheid has also made its mark on tobacco control, releasing new energies and resources and a significantly greater opportunity for true pan-African cooperation.

Asia was also well represented, with much progress to report as well as many challenges ahead. The WHO's Western Pacific Region has provided a commendable lead with its five-year campaign for an end to tobacco promotion in the region by the end of the century. Close cooperation with the local WHO office is also helping advocates in the Middle East. The delegation from Central and Eastern Europe was by far the biggest ever, with many individuals already having taken part in cooperative activities with Western European counterparts. And while Latin America fielded a smaller delegation this time – the last world conference was in Buenos Aires (see *Tobacco Control* 1992; **1**:89–92) – they could report continuing and well-organised cooperation among the anti-tobacco groups in each country in the region.

Perhaps the most heartening sign since Stockholm has been the emergence of a number of new international networks. The International Network of Women Against Tobacco goes from strength to strength, but this year they are joined in the fight by the new International Doctors Against Tobacco. In addition, the Swedish Nurses Against Tobacco are proposing to build an International Network of Nurses Against Tobacco. Dentists, too, had their own conference session, and more than 50 delegates took part in a meeting on religion and tobacco control. The point is not so much that all this happened (which in itself would have seemed a mere fantasy at Stockholm), but that at last tobacco is being placed on the agenda of groups with interests far wider than those of the medical and health professions, and those groups are forming international networks. Religious groups, for example, have played major lobbying roles in Australia and the US; and the potential for such action is even greater in parts of Asia and Africa, where religion is so much more widely practised than in the traditional tobacco markets. As communications improve (few delegates could have escaped a demonstration of the GLOBALink computer network now operated by the International Union Against Cancer), genuine international cooperation is now much more of a reality.

Economics and funding

The economics of tobacco gained a new level of prominence at the conference. Strikingly powerful new data from South Africa were presented, which has already impressed leading members of the new government. From Algeria came news of a dramatic fall in smoking prevalence among men from 77% to 53% in four years, as a result of a 400% price increase. Although this had been imposed for reasons of economic crisis rather than health, the effect is no less striking as a demonstration of the power of price to alter consumption. By far the most dramatic economic data, however, came from a senior economist at the World Bank, whose paper on the effect of tobacco on the global economy (reproduced in this issue on pages 358–61) showed a net *negative* impact of $200 billion dollars. With ammunition like this, surely advocates can now begin to capture the economic high ground from the tobacco industry.

Probably the single most pressing need among tobacco control advocates in the developing world is for funding. Those present in Paris must have had mixed feelings about the many millions of dollars available to colleagues in some of the US states (notably California, Massachusetts, and Michigan), which have earmarked tobacco tax revenues for health promotion activities. Most other states receive funding for tobacco control from the National Cancer Institute, the Centers for Disease Control and Prevention, and/or the Robert Wood Johnson Foundation. The Foundation has also committed $5 million for tobacco control policy research, with the limitation that it must be spent in the US. However, Canada's International Development Research Centre announced an international tobacco policy research initiative which will target some $2 million directly to developing countries.

Looking ahead

Thus the next world conference could hear the first results of new programmes in countries where until now the fight between tobacco interests and health advocates has been entirely one-sided. That would be especially appropriate in view of the choice of venue – Beijing, China, in 1997. With a quarter of the world's smokers and a third of its cigarette consumption, China will provide a particularly strong focus for addressing the problems of tobacco control.

It seems likely that delegates to Beijing will feel even more strongly that international efforts to quell the tobacco epidemic, while certainly improved, remain hopelessly inadequate. This sentiment gave rise in Paris to an interesting resolution emanating from Australia for a United Nations convention on tobacco control. While the chances of bringing this to fruition seem far from certain, the promotion of the idea may at least help to put tobacco on the agenda at a higher level in the inter-governmental arena. Those returning from Paris will be especially aware that without such a major change in priority, tobacco control will still have a long way to go. –

DAVID SIMPSON
News editor

Resolutions of the Ninth World Conference on Tobacco and Health

This conference resolves that:

1 All nations implement the International Strategy for Tobacco Control (see below).

2 The Prime Ministers of Germany, United Kingdom, and The Netherlands be informed by formal letter from the President of this Conference and individual letters from conference participants that their governments' action in blocking the implementation of the Directive on Tobacco Advertising in the European Union is an international scandal and is detrimental to the health of all citizens of the European Union, and by example of the citizens in all developing regions of the world who look to the European Union for leadership in public health policy.

3 The International Strategy for Tobacco Control (resolution 1) should be implemented by all the governments of Central and Eastern Europe. Moreover, the Western governments which have the headquarters of the transnational tobacco companies (which now control a majority of the tobacco production capacity in the Central and Eastern European region) should share the responsibility for ending the tobacco epidemic and should assist governments in the region to implement the strategy.

4 This conference further resolves that:

a) Duty-free sales of tobacco products be prohibited.

b) National Governments, Ministers of Health, and the World Health Organisation should immediately initiate action to prepare and achieve an International Convention on Tobacco Control to be adopted by the United Nations as an aid to enforcement of the International Strategy for Tobacco Control adopted by the Ninth World Conference on Tobacco and Health.

c) Leaders of all religious communities be urged to adopt an official position and take action to protect humanity from the dangers to health from tobacco.

d) An Islamic Council for Tobacco Control be established.

e) National governments be encouraged to take measures leading to the adoption of generic packaging as a means of reducing inducements to tobacco consumption.

f) In view of the vital importance of information and data exchange, the European Commission is strongly urged to maintain its support for the European Bureau for Action on Smoking Prevention (BASP) to enable this organisation to continue its major contribution to tobacco control in the European Union.

An International Strategy for Tobacco Control

Since measures to deal with the tobacco problem must be comprehensive and long term, the following individual actions should form the basis of such a strategy:

1 Legislation to ban all direct and indirect advertising and promotion of tobacco products.

2 Legislation to protect young people from tobacco promotion and sales.

3 Policies to discourage the onset and maintenance of tobacco use including:
a) intensive health education and information to young people and adults;
b) wide availability of support for tobacco users who wish to stop.

4 Economic policies to discourage production and use of all tobacco products, including:
a) progressive significant increases in tax above inflation (and the growth of disposable income), and the allocation of a specific proportion of such taxes for tobacco control purposes;
b) action to discourage tobacco production and marketing by the abolition of all subsidies and protection for tobacco growers and the development of alternative economic, agricultural, and international trade policies;
c) removal of tobacco from national cost-of-living indexes;
d) measures to control smuggling of tobacco products.

5 Effective health warnings (on) and regulation of tobacco product packaging and on such promotional material still permitted.

6 A policy for the regulation of tar and nicotine content of tobacco products.

7 Smoke-free public policies – to protect the health and rights of people in all common environments.

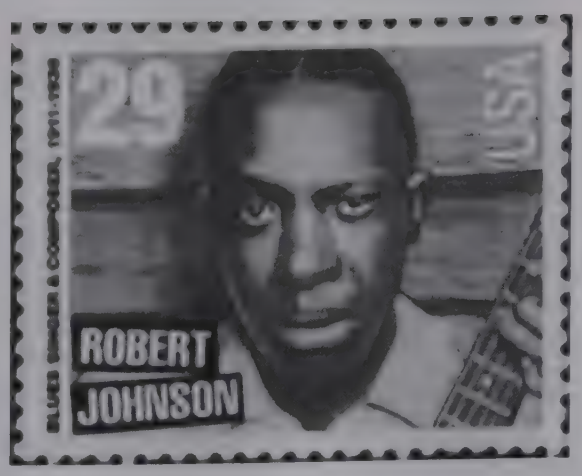
8 Policies to block future marketing initiatives of the transnational tobacco industry.

9 Effective national monitoring of the tobacco pandemic and the enforcement of these tobacco control measures.

Stamping out cigarettes

A controversy arose recently when the US Postal Service issued a stamp commemorating blues guitarist Robert Johnson (1911–1938) – minus his cigarette. Johnson was honoured along with other jazz and blues greats in a series of stamps unveiled by the Postal Service at the Mississippi Delta Blues Festival in Greenville, Mississippi, on 17 September 1994. Johnson's cigarette, which appeared in the photograph used as a basis for the design of the stamp, was deleted from the stamp issued (see figure). Postal Service spokesperson Monica Hand noted that the Citizens Stamp Advisory Committee had recommended the action "because they didn't want the stamps to be perceived as promoting cigarettes".

Thomas Humber, president of the pro-smoking National Smokers Alliance, complained that the deletion of



Blues guitarist Robert Johnson, with and without his cigarette

Johnson's cigarette was "an affront to the more than 50 million Americans who choose to smoke". Letters in *USA Today* (30 September 1994) and the *Chicago Tribune* (29 September 1994) raised other howls of protest, accusing the "self-anointed guardians of the anti-smoking cartel" of puritanical censorship intended to "remake the world into the perfect setting we wish it would be". However, in a guest column in the *Washington Post* (22 October 1994), American Cancer Society president Irving Fleming defended the action. Fleming noted that stamps "are always artists' renderings, specifically designed to make a particular point about the United States. They are creative efforts, not news photographs or formal history." He pointed out that the stamp, compared with the photograph, also showed Johnson with a different background, moved the guitar, and changed his fingering of the strings.

The National Smokers Alliance is an organisation underwritten by Philip Morris. In 1992 Philip Morris was the seventh largest industrial corporation in the US and made more money that year ($4.9 billion) than any other company in the US. Humber, in addition to being the president of the National Smokers Alliance, is vice-president of Burson-Marsteller, Philip Morris' public relations firm. Previously he was a public relations director for Philip Morris in Switzerland and prior to that worked for Brown & Williamson Tobacco Company. The National Smokers Alliance sends recruiters around the country to sign up new members, paying a commission for each enlistee. Cliff Douglas, a former lobbyist for the American Cancer Society, observed "The tobacco industry is hiding behind these groups to serve its own interests before the public and Congress. It's a classic example of how big money talks in Washington".

Greenville, Mississippi, in addition to being the site of the Delta Blues Festival, is the home of Washington County Circuit Judge Eugene Bogen. Judge Bogen, in a recent landmark ruling, noted that "Cigarettes are, as a matter of law, defective and unreasonably dangerous for human consumption. Cigarettes are defective because when used as intended, they cause cancer, emphysema, heart disease, and other illnesses". In neighbouring New Orleans, Louisiana, also known for its jazz, black males suffer one of the world's highest rates of lung cancer. According to the US Centers for Disease Control and Prevention, African Americans account for a disproportionate amount of the five million years of potential life lost annually because of smoking (*MMWR* 1994; **43(SS-1)**: 1–8).

It is good to see the US Postal Service finally taking a step in the right direction, given its clouded track record on tobacco and health. The 1907 issue of the Postal Service honouring the 300th anniversary of the founding of Jamestown prominently displayed tobacco. In 1982 the Centenary issue honouring US President Franklin Delano Roosevelt showed Roosevelt with his cigarette. His death – and those of Presidents Lyndon Johnson and Ullyses S Grant – were related to tobacco smoking.

However, stamps depicting TV news presenter Edward R Murrow and trade union boss George Meany – both well-known smokers – did not show them puffing away. Likewise a stamp honouring Nat King Cole, issued in September 1994, did not show him smoking, even though he died of smoking-attributable lung cancer.* Perhaps it would make sense for stamps to show celebrity smokers with their cigarettes, as long as the role of smoking in their deaths is disclosed in the stamp. The most important action the US Postal Service could take would be to join the 54 other nations of the world that have issued anti-smoking stamps and related postal items (see *Tobacco Control* 1992; **1**: 5–6; and 1993; **2**: 336).

JAMES H LUTSCHG
Baton Rouge, Louisiana, USA

* See pp 300–1 – ED

Camel burgers

In August 1994, Paris branches of McDonald's fast food chain were found to be distributing magazines containing advertisements for Camel Trophy watches. The 16-page colour magazine entitled *Ça se passe comme ça* (That's what's happening) reports on contemporary pop music and movies aimed at teenagers. Camel Trophy watch ads were displayed on the back page of the magazines. The French anti-smoking group Comite National Contre Le Tabagisme (CNCT) pointed out that very few McDonald's customers would be able to afford an expensive Camel Trophy watch, whereas the new 10 franc packs of Camel cigarettes would be easily accessible to young people. CNCT asked McDonald's, which may have been unaware of the offence, to stop distributing the magazines, or remove the ads, and the latest edition is cigarette-free.

The Loi Evin, the French tobacco law which took effect in January 1993, makes indirect advertising of tobacco via other products illegal, but only when a financial or legal link can be established between a tobacco company and the product. Consequently, a number of offshore holding companies with complex chains of subsidiaries have started to advertise boots, clothing, watches, and other items bearing cigarette brand names since the law was enacted. Establishing a link between the products and the cigarette companies can be a complex business and can take as much as a year, but CNCT believes it is worth filing a complaint with a judge immediately each new abuse is spotted, to ensure that the law is fully enforced. The thought of visits to cigarette company offices by special squads of police investigating on behalf of the judge does have a certain appeal .... – DS

Croatia: win some, lose some

A happy exception to our statement that Croatia's cigarette advertising ban was completely unenforced (see *Tobacco Control* 1994;3:105) has been reported from the town of Rijeka, where Rothmans sun umbrellas and other forms of advertising began to appear early in 1994. Many Croatians were baffled, unaware that the Rothmans brand was even for sale in their country. But Rijeka's Community Inspector, the local administrative official, had no doubt that these were illegal cigarette advertisements, and not simply ads "for the name of a company which produces a lot of different products", as claimed by the shops with the umbrellas. The inspector fined the shops, which appealed, but the State Tribunal, the highest court, duly confirmed that the ads were indeed for tobacco and were thus a violation of the law.

If Rothmans suffered a legal defeat in one of its newest markets, a local company, Rovinj Tobacco Factory, seems to have been more successful in applying the marketing tricks of its international counterparts. In September it sponsored a three-day yachting event using the name of its Ronhill brand. Boats, sails, and the Croatian crew's T-shirts bore the Ronhill logo and there was frequent mention of the brand during TV sports coverage. Apparently the programme for the participants from 12 countries included a tour of the cigarette factory, where they were to be shown the latest product – Marlboro. Overall, despite the win against Rothmans, the outlook for public health in Croatia does not look fair. – DS

Global smoking mortality

Smoking currently accounts for one-sixth of all deaths in developed countries, according to a new report by scientists from the Imperial Cancer Research Fund, the World Health Organisation (WHO), and the American Cancer Society. Worldwide, smoking is already causing three million people to die prematurely each year and this number is increasing. One of the authors of the report, Professor Richard Peto of Oxford University in the UK, said: "In most countries the worst is yet to come. If current patterns persist, then by the time the young smokers of today reach middle or old age there will be about 10 million deaths a year from tobacco – one death every three seconds."

The report covers deaths from tobacco between 1950 and 2000. It traces the smoking epidemic in developed countries over the previous four decades and contains new, previously unpublished data from each of the major developed countries (including, for the first time, figures for the individual countries of the former Soviet Union), together with projections on deaths in developing countries. A co-author of the report, Dr Alan Lopez of the WHO, said that by 2025 about half a billion of the world's population will be killed by tobacco, representing 16% to 18% of all deaths worldwide. – DS

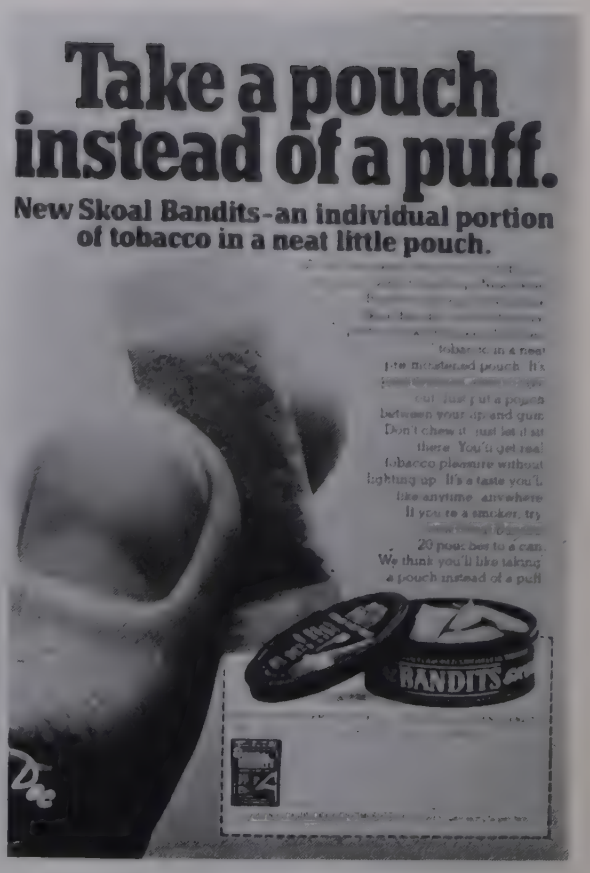
Source: Peto R *et al. Mortality from smoking in developed countries 1950–2000.* Oxford: Oxford Medical Publications, 1994.

It's still tobacco

A controversy has broken out among researchers and tobacco control advocates in the US, over plans to give reluctant smokers oral tobacco in place of cigarettes. Smokers over 18 are being recruited by researchers at the Molecular Genetics Program of the University of Alabama at Birmingham (UAB), to see whether they can replace cigarettes with snuff or chewing tobacco. The study's protagonists argue that smokeless tobacco is associated with fewer health risks than smoking; and that it was all about lowering risk – "not ideal, obviously" as Dr Ken Roozen, executive vice president at UAB put it to the *Journal of the National Cancer Institute*, "but there are people who simply will not quit".

But if they will not quit cigarettes, why should they try smokeless? Why not get them to try nicotine gum or patches instead? As Dr Marc Manley, head of Public Health Applications at the National Cancer Institute, puts it, "It certainly raises ethical questions for any health professional to encourage somebody to put a known carcinogen into his or her body when absolutely safe alternatives exist."

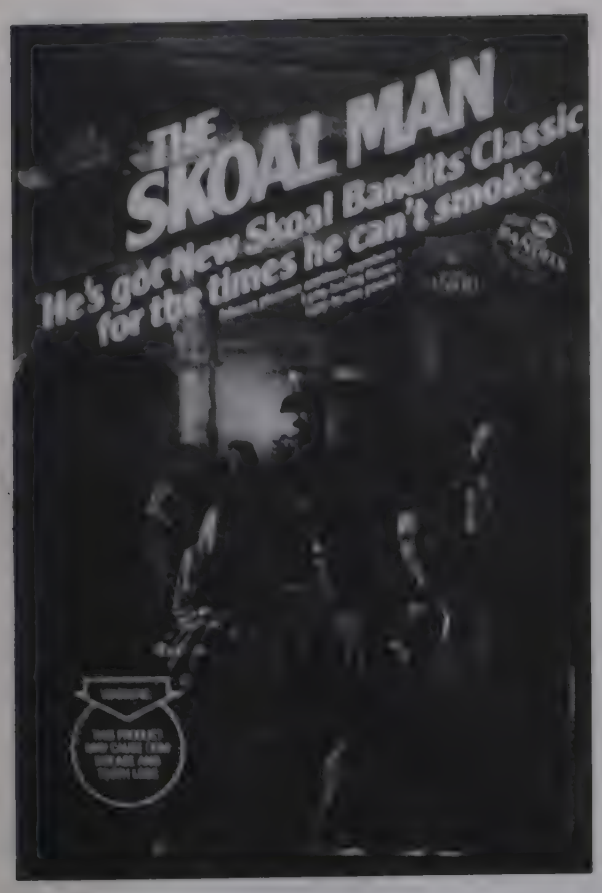
A major concern about what sounds like somewhat misguided research is how the massive US smokeless tobacco industry may handle the results. In a carbon copy of the cigarette industry's response to health research, the big manufacturers of



oral tobacco deny the health hazards known to be caused by tobacco chewing and dipping. These were thoroughly reviewed by the US Surgeon General in his 1986 report, which described oral tobacco use as a significant health risk. It was not, said the report, a safe substitute for smoking cigarettes; it can cause cancer and a number of noncancerous oral conditions, and can lead to nicotine addiction. If the manufacturers are prepared to deny all that, how likely are they to pay even momentary attention to health advocates' concerns about the substitution of smokeless tobacco for smoking? Encouraging its use, of course, is exactly what their entire business depends upon. The problem, then, is not just a question of policy about which forms of nicotine are abused, but how the manufacturers abuse the policy.

Smokeless tobacco manufacturers have already tried to woo smokers to their products by taking advantage of concerns about passive smoking. An ad for Skoal Bandits appeals to smokers to "Take a pouch instead of a puff". The fine print, in a subtle reference to public smoking restrictions, claims that "It's a taste you'll like anytime, anywhere." Another ad features "The Skoal Man", who uses Skoal Bandits Classic "for the times he can't smoke" (see figures). So with these precedents, one would imagine that the makers of smokeless tobacco are already devising strategies to promote the findings of the UAB research.

Other examples of policy abuse by tobacco manufacturers are the ways



cigarette makers have tried to benefit from the toxic reduction component of smoking control policy. This has been seen most clearly in the UK, where tar reduction has been a component of the notorious "voluntary agreements" between the tobacco industry and successive governments for many years. The tobacco industry's abuse has taken two courses: firstly, to try to justify continued tobacco advertising, arguing that to reduce average tar yields, new brands will have to be introduced and advertised to make the public aware of them; and secondly, to overemphasise the importance of toxicity reduction within overall tobacco control policy. It is, after all, the only aspect of policy which does not necessarily mean reducing consumption; and it is even possible, seeing that lower tar usually means lower nicotine, that lower average tar levels may mean *higher* total sales.

This tactic of trying to substitute tar reduction for all other action was plainly revealed in the early 1980s when a rare set of internal industry documents came to light. These were the "speaking notes" of the tobacco industry's chief negotiator in the fraught negotiations with the uncompromisingly pro-health Sir George Young, first of a long line of health ministers in Mrs Thatcher's government to negotiate with the tobacco industry. Sir George, well motivated, well informed, and well briefed by health organisations, resisted their ploys. The industry repeatedly tried to establish that "product modification", the canny industry euphemism for "selling just as many, but killing a few less", was the only area of policy that really needed attention. Why did they not just co-operate together on this one, obvious way forward? Sir George staunchly resisted, so that tar reduction was not even covered by the main agreement he squeezed from the manufacturers. They were increasingly worried by then that it would be legislation next time, and had to chase after him with a separate, unilateral declaration on reducing toxicity. (They need not have feared: within a short time Sir George had suffered a "myocalifano infarction", that sudden cutting off of political power in the fight against smoking which is experienced by so many fine health ministers, such as the eponymous Joseph Califano, Health Secretary under US President Jimmy Carter.)

No one doubts the importance of smoking cessation; but no one should underestimate the cynicism with which the manufacturer of one addictive, carcinogenic substance will try to exploit a change in the fortunes of another. In a country without tight comprehensive tobacco control policy, the UAB study seems not only unnecessary, but naïve to the point of recklessness.

DAVID SIMPSON
News editor
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Editor

A (passive) smoker in paradise

John Beasley, a 58-year-old retired taxi driver from Sydney, Australia, suffers from heart disease, asthma, and emphysema. He regularly has fluid drained from his lungs and has been advised by his doctor to not travel in aircraft for more than an hour. He has had a history of asthma attacks when in the presence of tobacco smoke. He became interested in taking a Pacific islands vacation on an ocean cruise ship in April 1994. A travel brochure for P&O's cruise ship *Fairstar* caught his eye because under the bold heading "Other important things you need to know", a paragraph stated that smoking was not permitted in any of the public areas of the ship except on deck and in three specified lounges.

The brochure stated that intending passengers with pre-existing medical conditions would need to advise the ship's management. Mr Beasley did this and obtained a letter from his doctor declaring that he was fit to travel on the ship, on the assumption that the non-smoking provisions were as they were described in the brochure.

Before the ship left its Sydney mooring, Mr Beasley was required to attend a fire drill in a lounge area that was designated non-smoking. Many people were smoking in the area and he suffered what would be the first of many asthma attacks he would experience on the nine-day cruise. Appeals to the ship's crew to enforce the no-smoking rules proved unsuccessful throughout the cruise and on returning to Sydney he was hospitalised for 10 days.

Mr Beasley is now suing the two companies operating the cruise for breach of contract and misrepresentation. He is seeking reimbursement for his ticket and damages for the health problems he suffered from exposure to cigarette smoke while on the ship.

The case is considered of critical importance in Australia. While the latest survey of smoke-free policies in workplaces shows that some 74% of large buildings claim to be totally smoke-free, Australian Action on Smoking and Health director Anne Jones believes that there is evidence of considerable back-sliding. She receives many calls from office workers who say that their company has an official smoke-free policy but that many workers ignore this with tacit support from management. She believes that many companies have simply "gone through the motions" of declaring a smoke-free policy but do not back this up in practice.

The *Fairstar* case appears to be a clear-cut case of a company offering a smoke-free service to customers and then not delivering. If the case succeeds it will send a major signal to the business community that smoke-free policies must exist not just in word, but in deed. –

SIMON CHAPMAN
Assistant editor

ORIGINAL ARTICLES

Do smoking ordinances protect non-smokers from environmental tobacco smoke at work?

John P Pierce, Thomas G Shanks, Mark Pertschuk, Elizabeth Gilpin, Donald Shopland, Michael Johnson, Dileep Bal

Abstract

***Objective* – To establish the relationship between the existence and extent of local smoking ordinances pertaining to the workplace and non-smoker exposure to environmental tobacco smoke (ETS).**

***Design* – Telephone survey.**

***Subjects* – Population-based sample of California residents ⩾ 18 years of age (n = 12802) interviewed as part of the 1990–91 California Tobacco Survey.**

***Main outcome measures* – Local smoking ordinances, ETS exposure, workplace smoking policies.**

***Results* – Overall, 40.6 ± 1.6% (± 95% confidence interval) of California indoor workers worked in areas with strong local smoking ordinances, 31.9 ± 1.7% in areas with weak ordinances, and 27.6 ± 1.5% in areas with no local ordinances. Non-smoker exposure to ETS ranged from 24.5 ± 1.9% for those working in areas with a strong ordinance to 34.8 ± 3.2% for those working where no ordinance was in effect ($p < 10^{-4}$). The percentage of indoor workers working in a smoke-free workplace decreased from 40.3 ± 1.7% for those covered by a strong ordinance to 31.1 ± 2.4% where there was no ordinance ($p < 10^{-5}$). However, in 1990, about 40% of indoor workers who worked in areas with a strong ordinance reported that their workplace had either no policy or only a weak policy restricting smoking.**

***Conclusions* – Strong smoking ordinances play an important role in reducing non-smoker exposure to ETS because the ordinances increase the likelihood that workplaces have anti-smoking policies. However, ordinances have yet to reach their full potential in protecting the non-smoker from ETS due to lack of employer compliance.**

(*Tobacco Control* 1994; 3: 15–20)

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Introduction

The health effects of environmental tobacco smoke (ETS) to the non-smoker include an increased risk of lung cancer and heart disease as well as a range of respiratory illnesses.[1–3] In addition to disease, many employees have reported discomfort from ETS in workplaces that permit smoking even if only in designated areas.[4] Non-smoker exposure to someone smoking recently in their work area (our measure of ETS exposure) is strongly related to the existence and extent of workplace smoking policies, with the lowest levels of exposure occurring in smoke-free workplaces.[5] Compared to non-smokers working in smoke-free worksites, ETS exposure was increased by a factor of 2.5 when the worksite smoking policy covered the work area but was not a total ban; with no policy or only a token policy, ETS exposure was more than eight times as high.[5]

Early workplace smoking policies were implemented primarily for safety reasons, but the majority of recent policies have been adopted to protect workers from ETS or to comply with smoking ordinances. Surveys of businesses suggest that many wait until they are legally required to restrict smoking before implementing a specific policy to protect non-smoking employees.[2]

Through the use of ordinances, local governments have the power to mandate that non-smokers be protected from ETS in industries that employ workers or service the public within the local government area. It has been reported recently that laws restricting smoking increased considerably at the local level throughout the 1980s so that by July 1989, 44 or 45 states reported some legal restriction on smoking.[6,7] However, comprehensive laws requiring smoke-free workplaces were uncommon in the US in 1989.[6,8] Between 1989 and 1992 the number of smoke-free workplace ordinances increased considerably.[9]

In this paper, we report population-based estimates of the percentages of California indoor workers covered by local smoking ordinances in 1990 and 1991. Further, we describe the association between the strength of these ordinances and the existence of worksite smoking policies and the exposure of non-smoking indoor workers to ETS.

Methods

SURVEY METHODS AND RESPONSE RATES

Between June 1990 and July 1991, 26815 adults were interviewed as part of the California Tobacco Surveys (CTS) commissioned by the California Department of Health Services and the Los Angeles Department of Health Services to establish a baseline for the evaluation of the California Tobacco Tax Initiative. Fieldwork for these surveys was undertaken by Westat, Inc, using a stratified Waksberg random-digit-dial telephone meth-

odology.[10] Information on the smoking status of all household members was obtained from 57246 households in California (response rate = 75.1%). An extended interview was conducted with 26815 adults: for the statewide survey, this group included 28% of all adult non-smokers, as well as all adults who had smoked in the last 5 years; for the Los Angeles supplementary survey, all Asian adults (2519) were scheduled for an extended interview. The response rate for the combined extended interview was 78%.

The survey was designed to be representative of 18 geographic regions of California, 10 of which represented the most populous counties: Los Angles, San Diego, Orange, Santa Clara, San Bernardino, Alameda, Riverside, Sacramento, Contra Costa, and San Francisco. The remaining 48 counties were allocated (in consultation with the counties themselves) into eight regions, containing between two and 15 counties each, designed to be somewhat similar and to have base populations of no less than 400000 people. Post-stratification weighting ensured that the regional samples were representative of the 1990 census data by age, sex, education level, and race/ethnicity.

Of the adults surveyed, 13199 indicated that they worked primarily indoors. The indoor workers were asked for the location of their workplace by postal ZIP code or town name. This information was used to determine the geographic location of the workplace for 12802 (96.5%) of the respondents. The location was then related (see below) to the level of the smoking ordinance in effect at that location during 1990, the period of the survey.

The 14-minute (average time) extended interview included a complete recent and lifetime smoking history and current and past use of other tobacco products. The survey also asked questions concerning health beliefs, social attitudes, policy-related opinions, smoking restrictions encountered in the workplace, physician advice to stop smoking, non-smoker assertiveness, and exposure to media messages regarding smoking.

QUESTIONS ANALYSED

Workplace restrictions on smoking were ascertained from three questions. First, "Do you/Does your employer have an official policy that restricts smoking in any way?" Those who answered "yes" were asked two follow-up questions: "Which of the following best describes the smoking policy for indoor public or common areas such as lobbies, restrooms and lunchrooms?" and "Which of the following best describes the policy for areas in which employees work?" Response choices were: not allowed in any, allowed in some, or allowed in all. From the responses to these questions, workplaces were categorised into the following three groups: 1) smoke-free workplace: smoking banned completely in both public and common areas and in work areas, 2) work area ban only: smoking allowed in some or all public or common areas but banned in work areas, 3) lesser or no restrictions: allowed in work area but some restrictions on public or common areas or no restrictions at all. Only 2.7% of respondents did not provide sufficient information to allow classification of workplace smoking restrictions. Respondents were also asked, "Altogether, do more than 50 people work at your worksite?" Exposure to ETS at work was assessed from the question, "During the past two weeks has anyone smoked in the area in which you work?"

Smoking status was assessed according to the standard questions,[2,11] "Have you smoked at least 100 cigarettes in your entire life?" and "Do you smoke cigarettes now?" Those responding "yes" to both questions were considered current smokers, those responding "yes" to the first question and "no" to the second one were considered former smokers, and the remainder were considered never-smokers. Both former and never-smokers were considered non-smokers for the analysis of ETS exposure.

Two additional questions were examined as a measure of non-smoker assertiveness: "In the past 12 months have you ever asked someone not to smoke in a certain situation?", and, if the answer to this question was "no", respondents were asked: "Would you ever ask someone not to smoke?"

DEFINITION OF WORKPLACE ORDINANCE LEVELS

Smoking ordinances vary primarily in two ways: comprehensiveness and strength. A comprehensive ordinance covers workplaces, restaurants, and other enclosed public places, such as retail stores. An ordinance that covers only restaurants, for example, is not considered comprehensive. The strength of the ordinance relates to whether the requirement is for no smoking at all or for more limited restrictions. The strength of smoking ordinances varies widely, with more recently adopted laws tending to be stronger.

In this study, we were concerned with the local laws regulating smoking in the workplace. The questionnaire asked each respondent for his or her workplace ZIP code (provided by 77.4% of respondents), and if the ZIP code was not known, another question asked for the town name (provided by another 19.1% of respondents). We then used a database maintained by Americans for Nonsmokers' Rights (Berkeley, California) under the auspices of the National Cancer Institute to classify the strength (strong, weak, or nonexistent) of the ordinance for each location as of June 1990. The primary criterion for the existence of an ordinance was inclusion of some provision protecting employees in both the private and public sectors from ETS. For a local ordinance to be classified as strong, it had to have a "non-smoker preference clause" (giving the non-smoker's need for smoke-free air priority in conflict regarding the smoking policy) or a clause permitting non-smokers to designate their own immediate work areas as non-smoking, and it had to prohibit smoking in

common areas such as meeting rooms, halls and restrooms. All other workplace ordinances were classified as weak. According to these criteria, ordinances regulating smoking only in local government buildings were not judged to qualify as weak ordinances and were grouped in the nonexistent category.

These designations were then checked with a separate classification system developed by San Diego State University from responses by individual counties to questions on the ordinances in existence in 1990. Finally, the resultant classification of ordinances for areas within each county was verified by the county Tobacco Control Program Coordinator. Any remaining discrepancies were resolved by reviewing the actual text of the ordinance in effect at the time of the survey. Minor modifications were made following each verification step. Although the survey continued into mid-1991 in Los Angeles County, no changes in smoking ordinances occurred there during this period.

STATISTICS

Confidence intervals for all percentages reported were derived by a variant of the jackknife procedure.[12] In this study, 33 subsamples were taken from the full survey file, and sample weights were computed according to the same procedure used for the full sample. Variances were estimated based on the deviations of the subsample percentages from those of the full sample. The computed variances were then used to derive 95% confidence intervals in the usual manner. Chi-square statistics were computed using a method (Satterthwaite's approximation) based on the subsamples (see above) which adjusts for survey design.[13] Pearson's simple and partial correlation coefficients were computed to examine the relationships among non-smoker ETS exposure, level of worksite smoking policy, and level of local ordinances among the 18 California regions.

Results

SMOKING ORDINANCES IN CALIFORNIA IN 1990

In 1990, approximately 190 local smoking ordinances existed in California. Of these, approximately 175 contained provisions limiting smoking in workplaces. Of the 13199 indoor workers interviewed in the CTS, we were able to classify 6184 subjects ($39.1 \pm 1.6\%$) as working in areas with *strong* ordinances; 3121 ($30.7 \pm 1.6\%$) as working in areas with *weak* ordinances; and 3497 ($26.6 \pm 1.5\%$) as working in areas with *no ordinances*. Some 397 (3.5%) respondents could not be matched with an ordinance because the town name could not be identified or was out of state; these workers were not included in the analyses described below.

Of those indoor workers whose workplace could be categorised, $40.6 \pm 1.6\%$ were covered by strong smoking ordinances, $31.9 \pm 1.7\%$ by weak ordinances, and $27.6 \pm 1.5\%$ by no ordinance. A high percentage of workers residing in Alameda, Contra Costa, Santa Clara, San Francisco, and Sacramento counties were covered by strong ordinances whereas workers in San Diego, Los Angeles, and the region comprising San Luis Obispo, Santa Barbara, and Ventura counties predominantly worked under weak ordinances. The highest percentages of workers not covered by a smoking ordinance were in the region including Imperial, Inyo, Kern, Kings, Mono, and Tulare counties; in the region including Butte, Colusa, Del Norte, Glenn, Humbolt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Siskiyou, Tehama, Trinity, and Yolo counties; and in Orange and San Bernardino counties.

ORDINANCE LEVEL AND THE TYPE OF WORKSITE SMOKING POLICY

Worksites in areas with strong ordinances were more likely to have total smoking bans than those with weak or no ordinances (figure 1). The percentage of indoor workers covered by a total ban decreased from $40.3 \pm 1.7\%$ for those in locations with strong ordinances to $36.0 \pm 2.6\%$ for those in locations with weak ordinances, and to $31.1 \pm 2.4\%$ for those not covered by a smoking ordinance. These differences are statistically significant ($p < 10^{-5}$). Conversely, the percentage of workers covered by lesser or no worksite smoking restrictions at all increased as the ordinance level declined from strong to no ordinances.

ORDINANCE LEVEL, WORKSITE POLICY, AND ETS EXPOSURE

Figure 2 provides the percentages of non-smokers (n = 8501) exposed to ETS in work-

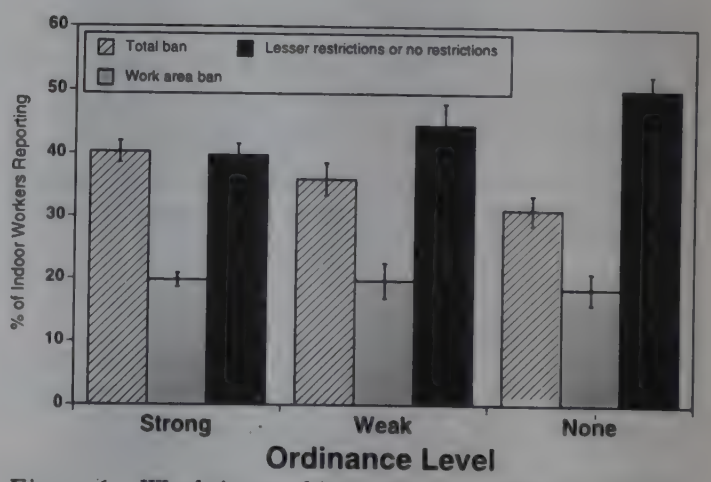

Figure 1 Worksite smoking policy according to level of ordinance.

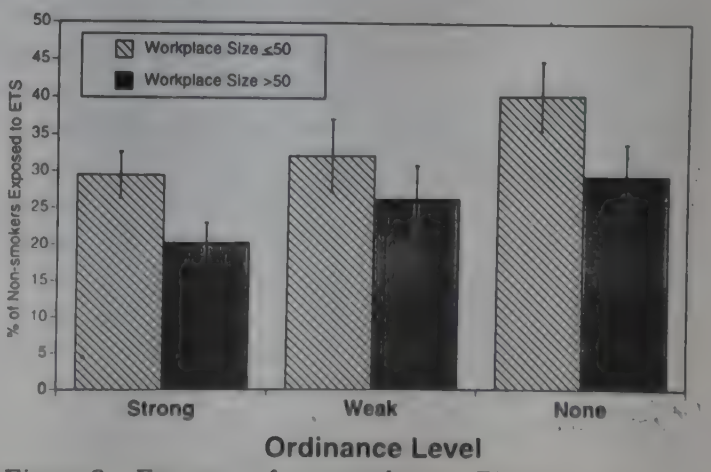

Figure 2 Exposure of non-smokers to ETS by ordinance level and size of workplace.

sites by strength of ordinance and workplace size. Non-smoker exposure to ETS appears to be lower in larger workplaces compared to smaller workplaces regardless of the strength of ordinance in effect ($24.3 \pm 2.4\%$ *vs* $33.4 \pm 1.8\%$, respectively, $p < 10^{-6}$). Non-smokers were evenly distributed between small and large workplaces. In strong ordinance areas (regardless of workplace size) the overall percentage of non-smokers exposed to ETS was $24.5 \pm 1.9\%$; in weak ordinance areas exposure was $29.1 \pm 3.8\%$; and in no ordinance areas it was $34.8 \pm 3.2\%$ ($p < 10^{-4}$).

Figure 3 shows the percentage of non-smokers exposed to ETS in worksites with a total ban, work area ban, and lesser or no restrictions, according to whether the workplace was in an area with strong, weak, or no ordinances. This figure shows that the level of ETS exposure is more strongly related to the strength of the worksite smoking policy than to the existence of an ordinance. Even in areas with no ordinance, exposure to ETS is low if the workplace is smoke-free. However, in worksites with a work area ban, but not a total ban, the existence of a strong ordinance appears to reduce the exposure to non-smokers to ETS ($14.4 \pm 3.1\%$), compared to areas with weak ($28.1 \pm 9.4\%$) or no ordinances ($26.5 \pm 6.6\%$) ($p < 0.012$ with work area ban category; $p < 10^{-6}$ overall).

The correlation between the rate of ETS exposure of non-smokers and the rate of smoke-free workplaces among the 18 regions was high ($r = -0.84$, $p < 10^{-4}$, two-sided). Regions with workers reporting the highest percentages of smoke-free workplaces had the lowest levels of non-smoker ETS exposure. The relationship between ETS exposure rates for non-smokers and the rates of coverage by strong ordinances was lower but still significant ($r = -0.48$, $p < 0.05$, two-sided). When a partial correlation coefficient was computed between the rate of non-smoker ETS exposure and the prevalence of strong ordinance controlling for the rate of smoke-free worksites, the correlation was only marginally altered ($r = -0.52$, $p < 0.05$, two-sided).

RELATIONSHIP OF ORDINANCE LEVEL AND RESPONDENT SMOKING STATUS AND ASSERTIVENESS

One might hypothesise that the existence or strength of an ordinance is related to smoking prevalence in the local area or to the degree of non-smoker assertiveness in the local area. However, figure 4 shows that the percentage of smokers in areas classified as having strong, weak, or no ordinances is remarkably uniform ($p < 0.11$).

The degree of non-smoker assertiveness, as measured by reported willingness to ask someone not to smoke, also appears to be unrelated to the existence or strength of a local area ordinance (table). The percentage of non-smokers who have recently asked someone not to smoke or who would be willing to ask does not differ significantly among the ordinance groups.

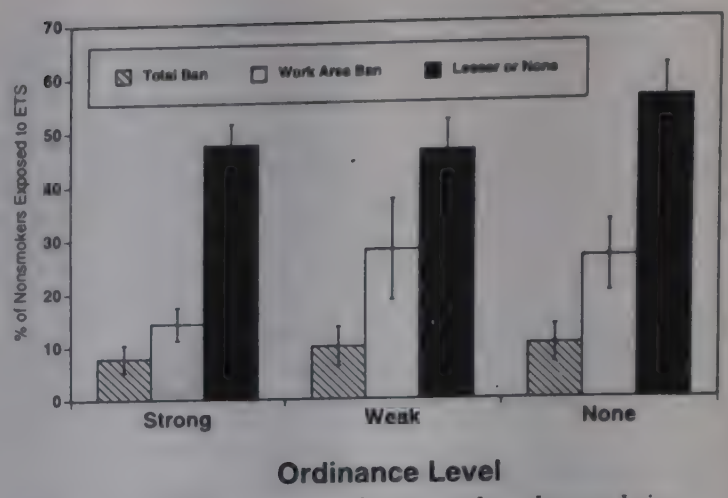

Figure 3 ETS exposure of non-smokers by worksite smoking policy and ordinance level.

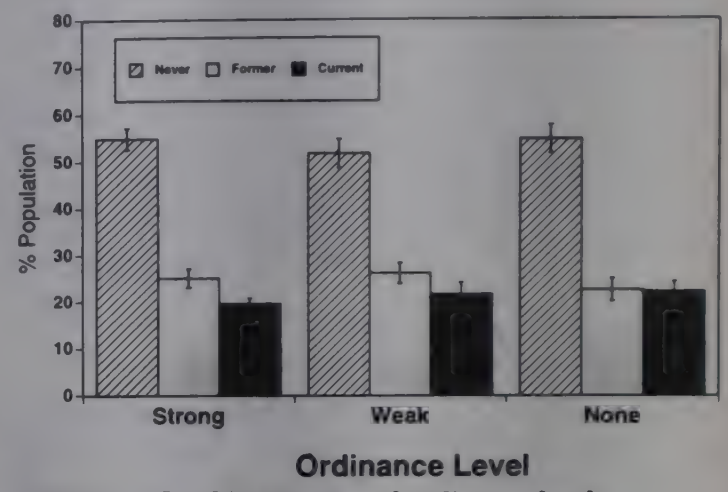

Figure 4 Smoking status and ordinance level.

Table Ordinance level related to non-smoker anti-smoking assertiveness

	Ordinance level		
	% strong	*% weak*	*% none*
Recently asked	48.4 ± 2.4	44.0 ± 4.8	45.6 ± 5.1
Has, but not recently	29.9 ± 1.9	33.3 ± 5.3	30.3 ± 5.2
Not willing to ask	21.8 ± 2.2	22.7 ± 3.8	24.1 ± 4.2

Entries are weighted percentages ± 95% confidence intervals.

Discussion

We have shown previously that the level of worksite smoking policy is highly related to non-smokers reporting ETS exposure in their work area.[5] The current report establishes for the first time that strong local area smoking ordinances increase the likelihood that worksites have smoke-free policies. The variability among the 18 regions in California further demonstrates the relationship between increased non-smoker protection from ETS and the existence of strong smoking ordinances. Even when controlling for the percentage of non-smokers covered by smoke-free workplaces, the relationship between strong ordinances and non-smoker ETS exposure was apparent. To our knowledge, the results from this study provide the first link between the existence of smoking ordinances and protection of non-smokers from ETS.

In addition to protecting the non-smoker from ETS, strong worksite smoking policies appear to reduce cigarette consumption by regular smokers,[14–17] and to encourage quitting.[15,18–20] It also has been suggested that restrictive smoking policies may discourage young people from starting to smoke.[14,15,21–24] In another analysis of the CTS data, we

projected that cigarette consumption would drop by about 40% among indoor workers if all worksites were smoke-free.[17] Thus, to the extent that smoking ordinances promote the adoption of meaningful worksite smoking policies, they produce health benefits for smokers as well.

Tobacco companies have lobbied relentlessly to dilute and delay the passage of protective legislation. However, in a case study of the consideration of three such ordinances by local governments in California in 1990, Samuels and Glantz concluded that the pro-health lobby at the local community level also had considerable power to influence the passage of such ordinances.[25] Indeed, they concluded that if the pro-health lobby mobilised its resources effectively, it would be able to overcome the influence of tobacco companies and ensure that protective ordinances are passed and not repealed. Our measure of personal assertiveness (table) was not related to an increased prevalence of smoking ordinances. However, the level of motivation to act as an individual is different from the level of motivation that would lead someone to join an organisation that works for non-smokers' rights. Also, we could not demonstrate any link between smoking prevalence and the existence of smoking ordinances.

In areas with strong local ordinances, work area smoking bans (a less restrictive category than a total ban) appear to be substantially more effective in reducing non-smoker exposure to ETS (figure 3). One possible explanation for this finding is the right of the non-smoker covered by a strong ordinance to dictate workplace policy in the event of a conflict between a smoker and a non-smoker. Furthermore, strong ordinances provide legal recourse for any individual dismissed from a job for asserting the right to a non-smoking working environment. Another possible explanation is that in some areas community norms, which possibly led to the passage of strong smoking ordinances, may have an impact. Perhaps non-smokers are more assertive or smokers more sensitive regarding smoking where work area restrictions are in place.

Smoking ordinances can only be effective in protecting non-smokers from ETS if their provisions are actually implemented in the workplace. About 40% of the workers in our survey who worked in areas with strong ordinances reported minimal or no smoking restrictions in their workplace (figure 1). This finding may reflect either a lack of knowledge on the part of the employees concerning existing smoking policies or the need for increased compliance with local ordinances. Typically, smoking ordinances are enforced by public health departments with little or no resources allocated for this effort.[2] Ordinances are enforced only in response to complaints.[8]

In January 1993 the US Environmental Protection Agency issued a report classifying ETS as a Group A (known human) carcinogen on a par with asbestos.[26] Already, employers have been sued by workers who developed smoking-related diseases after long-term exposure to ETS at their workplace.[9,27,28] Compliance with local smoking ordinances will probably increase when the legal implications about employer liability become more well known. Also, local governments that have only weak or no ordinances will probably enact stronger and more comprehensive ones. For instance, some ordinances apply only to larger businesses, and this, together with difficulty in providing separate smoking areas in small firms, may account for the difference in non-smoker ETS exposure with worksite size (figure 2). Strong ordinances that require smoke-free workplaces simplify the issue of compliance within a workplace, because there is no interpretation of where smoking is or is not allowed. Encouragingly, the number of smoke-free ordinances passed in the US has increased dramatically from fewer than five in 1990 to over 30 in 1992.[9]

In conclusion, strong smoking ordinances are effective in reducing ETS exposure and appear to strengthen the effectiveness of work area bans in protecting non-smokers from ETS. Those interested in encouraging compliance with existing ordinances or promoting the adoption of stronger and more comprehensive ordinances should keep abreast of the legal implications of ETS being classified as a Group A carcinogen and use this information to lobby convincingly for these actions at the local level.

This study was supported by Contract #89-97872 from the California Department of Health Services, Tobacco Control Section, and Contract #64182 from the County of Los Angeles Tobacco Control Section.

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A smoking shelter outside a hospital in Columbus, Ohio, USA. Source: Duo-Gard Industries, Inc; Westland, Michigan, USA.

Smoking behaviour among female airline cabin crew from ten Asian countries

Cecilia Li, Richard Fielding, Gillian Marcoolyn, Chit Ming Wong, Anthony Hedley

Abstract

Objective **– To identify factors related to the high prevalence of smoking behaviour among a sample of female airline cabin crew of Asian origin.**

Design **– A questionnaire-based cross-sectional survey of 585 Asian women, aged 20–41 years working as experienced cabin crew for a major international airline.**

Main outcome measures **– Subjects answered questions on their knowledge of the consequences of smoking, the perceived effects of smoking, their perceptions of the social images of smoking and non-smoking women, and current and past smoking behaviour. Subjects also rated women depicted in cigarette, cosmetic, alcohol and luxury goods advertisements using ten predefined social descriptors.**

Results **– An overall current smoking prevalence of 26% (95% confidence interval 22–30%) was identified, with wide variation according to national origin of subjects. More than 75% of respondents were aware of the commonly emphasized hazards of smoking, and no significant differences were found in health knowledge between smokers and non-smokers. However, only about half of the subjects correctly identified the interactions between smoking and oral contraceptive use and the increased risk for heavy smokers of dying before the age of 65 years. More smokers than non-smokers believed cigarettes could help control body weight. Smokers emphasized positive effects of smoking more than non-smokers, and smokers tended to perceive women depicted in cigarette advertisements as attractive, elegant, fit, sociable, and adventurous to a greater degree than did non-smokers.**

Conclusions **– There was no difference in health knowledge about tobacco-related diseases between smokers and non-smokers. It seems, therefore, that health risks alone are not reason enough for smokers to change smoking behaviour in this study population. Instead, health promotion should emphasize the social detriment of smoking for women, and restrictions on the depiction of positive social images in tobacco advertising should be considered.**

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Introduction

Current female smoking prevalence rates in industrialised countries are approaching those of males, as is the amount smoked by females. Efforts to prevent smoking in these countries have contributed to reductions in smoking rates that are more rapid among males than among females.[1] Women are also taking up smoking at younger ages.[1,2]

Conversely, smoking rates in Asia are increasing. Potential market expansion makes Asia the key target for the tobacco industry. Among Asian women, the prevalence of smoking is increasing. With some specific exceptions, smoking prevalence rates among females in Asia range from 3 to 14% (figure 1) and generally remain lower than those of western countries where female smoking rates are generally about 30%.[3]

Among Asian countries, Japan currently has the highest female smoking rate (14%), while Hong Kong has the lowest (3%) (figure 1). In Hong Kong, however, these summary statistics conceal higher smoking rates and important trends in some groups. Age-specific prevalence rates for female smokers in Hong Kong reveal that smoking rates among the younger age groups have increased over the past 10 years. The population age-specific prevalence rate of smoking among the 15- to 19-year-old group has increased from 0.4% to 1.1%, and among the 20- to 29-year-old group from 1.5% to 2.0% between 1982–1990 (figure 2).[4] Similarly, in Taiwan, the prevalence of female smokers almost doubled from 7.0% to 13.4% during a 12-month period from 1989–1990, where women aged 15–17 years have the second highest smoking rates after women aged over 61 years.[5] In Hong Kong a recent study of female primary school children aged 8–11 years found ever-smoking prevalence ranged from 3.3% (primary 3) to 6.9% (primary 4).

If this trend is not controlled, prevalence rates among young Asian females may soon rival those in developed countries.

The principal aim of this study was to identify reasons for the uptake, maintenance, and cessation of smoking among a group of young professional Asian women from nine countries: Korea, Thailand, Philippines, Malaysia, Singapore, Japan, Indonesia, India, Taiwan, and the territory of Hong Kong; and ultimately to use these data to design strategies to combat the increase in smoking.

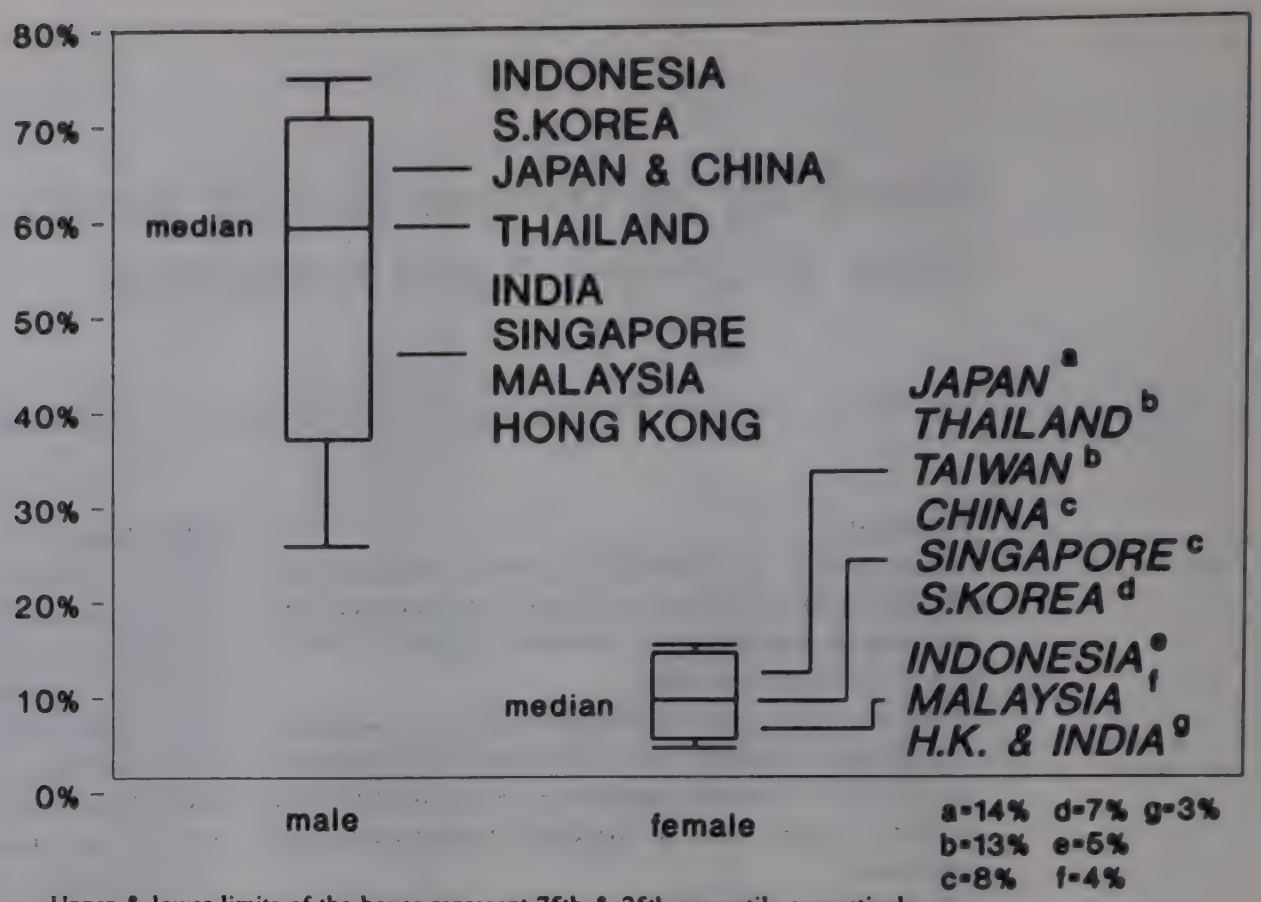

Figure 1 Quartile distribution for female smoking prevalence in Asia

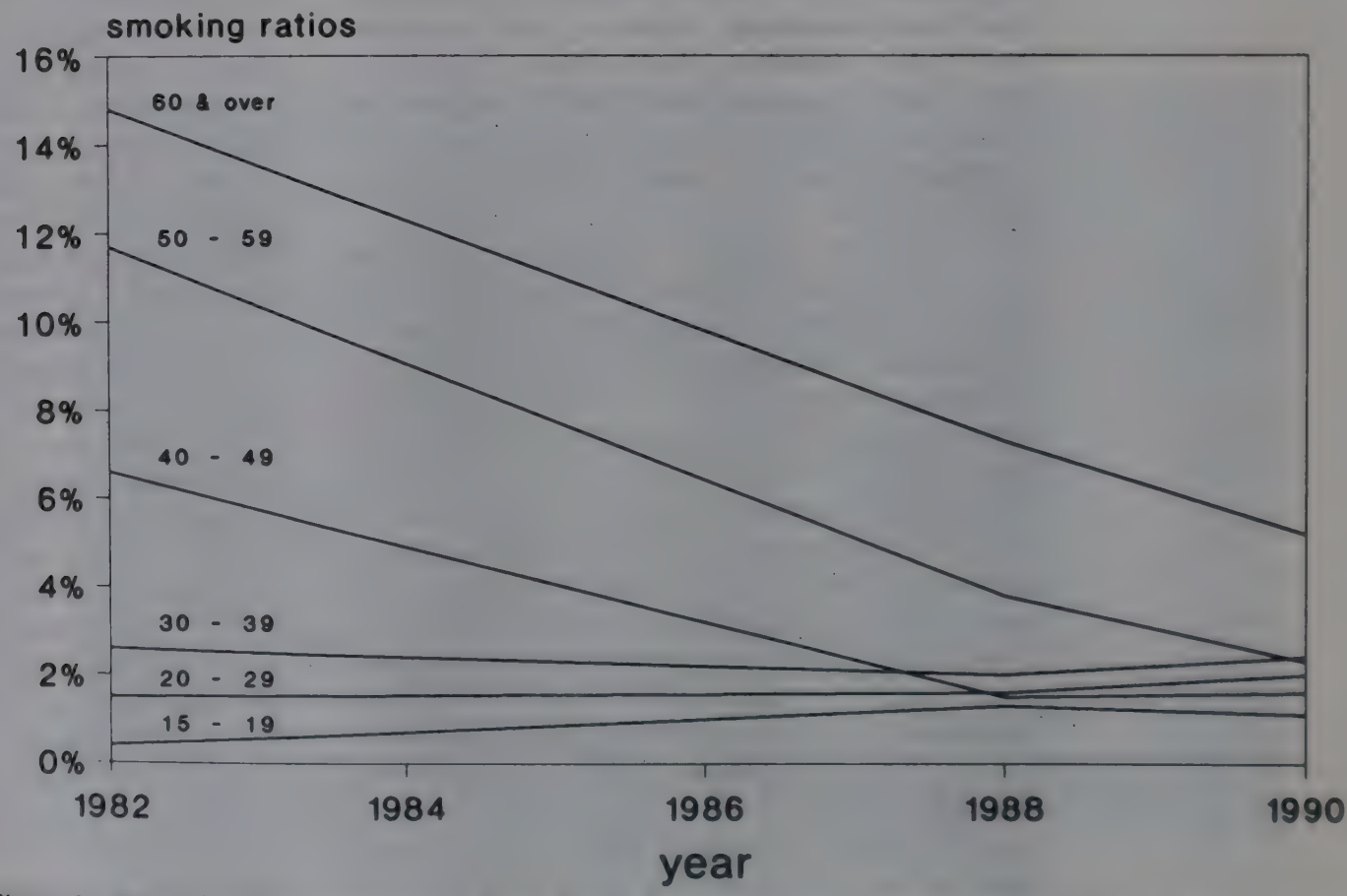

Figure 2 Female smoking prevalence in Hong Kong. Age-specific ratios in the years 1982, '88 and '90

Methods

BACKGROUND

Estimated smoking rates in the region of 25% among female cabin crew prompted the principal medical officer of a major airline to approach us to carry out a series of surveys from April 1990 onwards to confirm and study the possible reasons for this high smoking prevalence.

SUBJECTS

Subjects comprised female cabin crew attending courses at the staff training centre of an international airline from April to September 1990. A total of 585 experienced crew attending refresher courses were recruited representing a response rate of 91.5%.

The working environment of the crew includes both regional and intercontinental flights on wide-bodied jets. All of the crew in the study had duties related to passenger hospitality and flight safety. Crew are allocated on an individual basis to an average of 60–70 flight hours in a month, with periods of nine days off per month.

SURVEY INSTRUMENT

Subjects completed a self-administered ques-

tionnaire and took part in a brief group presentation. The instrument was designed to assess: 1) their knowledge about the consequences of smoking, 2) the perceived effects of smoking, 3) the subject's perception of social images of smoking and non-smoking women, and 4) personal characteristics and smoking behaviour.

English is not the first language of most of the cabin crew; therefore, to minimise error from differences in comprehension of the questionnaire, three steps were taken. First, the questionnaire was worded in very simple english. Second, a researcher was available to explain queries at most of the data collection sessions. Third, clear definitions of the ten characteristics that were used to assess the social images of smoking and non-smoking women were given to avoid misunderstandings. Although these measures may not exclude comprehension errors completely, few queries were raised about the meaning of the questionnaire items.

A number of pre-tests of the draft instrument were carried out with small samples. A formal pilot study was then carried out on a sample of 50 crew at the airline training centre, following which the survey instrument was refined and the method of presentation modified accordingly.

BELIEFS ABOUT HEALTH RISKS

Ten questions assessed beliefs about the health consequences of smoking. Each question was answered on a five-point Likert scale ranging from strongly agree to strongly disagree. To avoid acquiescence response set, five questions were phrased negatively. All were phrased in such a way that agreement reflected accurate belief; responses in agreement scored 1; and all neutral and missing items scored 0. A composite knowledge score was obtained for each respondent by summing the total number of correct items. The range of possible scores was 0 to 10. Higher composite knowledge scores represent more accurate respondent knowledge of the health consequences of smoking.

PERCEIVED COSTS AND BENEFITS OF SMOKING

Respondents were provided with a list of 14 consequences of smoking. Half of these were positive consequences and half were negative. Respondents were asked to choose their expectations of the consequences of smoking from this list. For each consequence, respondents were then asked to rate, on a scale ranging from 0% to 100%, their perceived probability of these consequences occurring if they smoked cigarettes daily.

SOCIAL IMAGES OF SMOKING

The frequent use of social images by tobacco companies in advertising suggests that they exert a powerful influence on smoking behaviour. In an attempt to assess the social images of smoking women, and after careful consideration of the women portrayed in tobacco advertisements, we selected seven characteristics. These were: feminine, attractive, elegant, fit, sociable, adventurous, and liberated. These terms were selected as having neutral to positive social desirability. As the women in tobacco advertisements are invariably depicted as having socially desirable characteristics designed to appeal (presumably) to women and girls, it was necessary to generate a number of less desirable characteristics to avoid biasing responses too much in a positive direction, so three terms considered to be neutral to negative were included. These were impulsive (neutral), lacking in confidence (negative), and unsophisticated (neutral/negative). Using these characteristics, respondents were asked to decide if each applied most to either smoking women, non-smoking women, or all women. Only one choice was allowed for each characteristic. Interpretations of the meanings of these terms are dependent on differences in individual understanding. To minimise variation in differences in English language comprehension between different nationalities, the definitions of these characteristics accompanied the questionnaire.

These ten characteristics were also used to describe women shown in six common advertisements, three of which were for tobacco and three for either alcohol or luxury goods. Each tobacco advertisement was matched with a non-tobacco advertisement based on: 1) the setting of the advertisement, 2) the number of persons depicted, and 3) the type of activity shown in the ad. Three pairs of advertisements were formed. The first pair included an alcohol advertisement paired with Kent; the second pair a cosmetic advertisement paired with Virginia Slims; and the third pair a watch advertisement paired with Salem. Each tobacco advertisement was shown after the non-tobacco advertisement. The subjects were given two minutes to classify the women depicted in each advertisement on the list of ten terms described above.

PERSONAL CHARACTERISTICS AND SMOKING BEHAVIOUR

Finally, respondents were asked about their personal characteristics and smoking behaviour, including age of starting smoking, reasons for starting or stopping smoking, and number of cigarettes smoked per day.

Respondents were asked to select one of five categories on the basis of their smoking status. These were: (a) regular smoker (smokes daily or at least once a week), (b) occasional smoker (smokes less than once a week), (c) ex-smoker (smoked in the past but has stopped smoking for at least one month), (d) trier (has tried smoking once or a few times only), and (e) non-smoker (never smoked).

DATA COLLECTION

The techniques used to elicit and collect data were a self-administered questionnaire and a slide show of the six advertisements. There

were two groups of experienced cabin crew, one undergoing safety training, and the other pre-promotion training. Time constraints led to two slightly different methods of data collection. These methods were: 1) classroom interview and questionnaire completion, and 2) a combined method (classroom interview with slide presentation for rating of advertisements and a take-home questionnaire). Data were collected at the airline training centre. However, despite reassurance given about confidentiality, some respondents, unsure of their employer's role in the study, were unwilling to tell us their smoking status. And some did not report their smoking status accurately. This was discovered by talking informally to a selection of cabin crew after the interview. The prevalence of smoking among cabin crew may be under-reported by about 10%. The effect of this will be to minimise rather than enhance any differences identified between smokers and non-smokers in the results.

ANALYSIS

The proportions of responses for each category were calculated for questions in each section. The original five smoking status categories were collapsed into three categories: 1) current smokers (including regular and occasional smokers), 2) ex-smokers, and 3) never-smokers (including triers and "non-smokers"). Means and standard deviations were calculated for group data. Chi-square values were calculated for goodness of fit and linear trend for the distribution of responses for these three groups. Associations between smoking groups and their perceptions of costs and benefits are indicated by odds ratios (ORs) using either current smokers or never-smokers as the reference (OR = 1 indicates the reference group). OR for categorical data were cast into a 2×2 table, the OR being = ad/bc, where a, b, c, and d are the cell counts of the table. All OR calculations used Epi Info version 5.0 (USD Inc, Stone Mountain, Georgia, USA, 1990).

Analysis of variance was used to compare the mean composite knowledge scores and the mean chance of developing adverse health effects of smoking for the three smoking categories of cabin crew. Prevalence rates are expressed as percentages with 95% confidence intervals (CIs) in parentheses. Simultaneous multiple comparisons between current, ex-, and never-smokers were carried out using the Scheffe test (SPSSPC version 4.0; SPSS Inc, Illinois, 1991).

Results

RESPONDENTS

The experienced crew were aged 20–41 years, with 87% being less than 30 years old. Twenty-five percent were married, 73% were single and 2% were cohabiting, separated or widowed. Sixty-nine percent had been employed by the airline for less than five years, 20% for 6–10 years and 11% for more than 10 years. Seventy-eight percent reported a religious belief, mainly Christian or Buddhist.

Most experienced cabin crew originated from the Philippines (22%), the Hong Kong Chinese Community (19%), Malaysia (14%), Singapore (14%), and Thailand (10%). Other subjects originated from Japan (7%), India (5%), Korea (5%), Taiwan (2%), and Indonesia (1%).

PREVALENCE OF SMOKING

Of the 585 experienced crew, 26% were current smokers, 11% ex-smokers, and 63% never-smokers (table 1). Korean women had the highest rate of ever smoking (67%; 95% CI = 50–84%), followed by Philippinos (42%; 33–51%) and Thais (42%; 30–54%). The smoking prevalence among Hong Kong crew was 24% (16–32%) (table 2).

SMOKING BEHAVIOUR

The average age at which respondents had started to smoke was 20 years. The most common reasons for starting smoking were: 1) an attempt to control mood (56%) 2) curiosity (47%), and 3) influence of friends (45%). Twenty-four percent of ever-smokers smoked more than 10 cigarettes per day, another quarter of the ever-smokers consumed 6–10 cigarettes per day, and half of the ever-smokers smoked less than six cigarettes per day. Seventy-three percent of ever-smokers reported having tried to stop smoking at least once. The remainder were occasional smokers who reported that they smoked too few cigarettes to quit. Ex-smokers were older ($F = 4.45$, $df = 2.568$, $p = 0.012$, more likely to be married ($\chi^2 = 7.58$, $df = 2$, $p = 0.023$), and had fewer smoking friends ($\chi^2 = 46.41$, $df = 4$, $p < 0.0001$). Among ex-smokers, 92% of them named their reasons for stopping smoking;

Table 1 Smoking prevalence among experienced female cabin crew

	Experienced crew	
Smoking status	*%*	*n*
Current smoker	26	152
Ex-smoker	11	62
Never-smoker	63	371
Total	100	585

Table 2 Prevalence of ever-smoking among cabin crew, by nationality

		Ever-smokers	
Prevalence	*n*	*%*	*(95% CI)*
Korean	30	67	(50–84)
Thai	60	42	(30–54)
Philippino	129	42	(33–51)
Malaysian	82	38	(27–49)
Singaporean	84	35	(25–35)
Japanese	38	34	(19–49)
Indonesia	6	33	(0–71)
Indian	30	33	(16–50)
Taiwan	12	25	(0–50)
Hong Kong	113	24	(16–32)
Total	584*		

* One respondent's nationality unknown.

Table 3 Beliefs about health consequences of smoking

Consequences of smoking	*% Holding belief*			
	Current smokers	*Ex-smokers*	*Never-smokers*	*Total sample*
Lung cancer	86	85	90	86
Pregnancy complication	84	74	83	83
Passive smoking is harmful	85	81	79	81
Shorten life	70	76	78	76
Heart disease	78	74	75	76
Shortness of breath	79	69	75	75
Filter cigarettes are harmful	72	74	69	71
Contraceptive interaction	59	58	51	54
Chance of dying	38	49	47	45
Helps control body weight	48	29	34	37*

* $\chi^2 = 10.22$; df = 2, p = 0.006

Table 4 Proportions (%) of ever-smokers and never-smokers perceiving listed costs and benefits of smoking

	Current smokers % (OR:95% CI)	*Ex-smokers % (OR:95% CI)*	*Never-smokers % (OR:95% CI)*	χ^2 *(for trend)*
Benefits				
Feeling relaxed	74 (3.9:4.4–10.9)	38 (1.5:0.8–2.7)	29 (1.0)	81.0***
Feeling good	70 (8.7:5.5–13.8)	34 (2.0:1.0–3.7)	21 (1.0)	103.0***
More at home in a group	42 (3.0:1.9–4.6)	26 (1.5:0.8–2.9)	19 (1.0)	25.2***
More attractive	25 (3.4:1.9–6.0)	13 (1.6:0.6–3.8)	9 (1.0)	21.3***
More alert and concentrate better	44 (3.6:2.3–5.7)	20 (1.1:0.5–2.4)	18 (1.0)	34.0***
Less bored	64 (5.2:3.4–8.1)	39 (1.9:1.0–3.4)	26 (1.0)	64.1***
More confident	34 (3.0:1.9–4.9)	23 (1.8:0.9–3.6)	14 (1.0)	23.4***
Costs				
Have lung cancer	81 (1.0)	87 (1.5:0.6–3.9)	90 (2.0:1.1–3.6)	6.6*
Stain fingers and teeth	84 (1.0)	89 (1.5:0.6–4.0)	92 (2.2:1.2–4.1)	7.1*
Shortness of breath	76 (1.0)	82 (1.4:0.6–3.3)	83 (1.5:0.9–2.5)	2.8
Die at younger age	61 (1.0)	83 (2.6:1.2–5.7)	79 (2.4:1.5–3.7)	14.9***
Addicted to cigarettes	76 (1.0)	85 (1.8:0.8–4.3)	79 (1.2:0.7–1.9)	0.3
Have heart disease	75 (1.0)	79 (1.2:0.6–2.7)	86 (2.1:1.3–3.5)	9.3**
Impaired taste and smell	60 (1.0)	77 (2.3:1.1–4.7)	73 (1.8:1.2–2.8)	6.9*

One degree of freedom for all trend tests. * $p < 0.05$, ** $p < 0.005$, *** $p < 0.0005$.
OR = odds ratios (OR = 1 indicates the reference group); 95% CI = 95% confidence intervals for odds ratios

(47/62) reported that they stopped for health reasons, 39% (22/62) had partners who objected to their smoking, and another 35% (20/62) stopped for reasons such as marriage, pregnancy, or loss of enjoyment from smoking.

BELIEFS ABOUT HEALTH RISKS

The majority of respondents were aware of the most commonly emphasized hazards of smoking, including lung cancer, shorter life expectancy, heart disease, pregnancy complications, shortness of breath, and the risks from passive smoking. The proportion who believed that these consequences applied ranged from 70% to 90%. However "smoking interactions with oral contraceptives" and "every one in six smokers, who smoke one pack of cigarettes daily, will die from smoking related disease before the age of 65" were outcomes of smoking recognised by only 35% to 60% of subjects. In general, there were no significant differences by smoking status in beliefs about the health consequences of smoking except that a higher proportion of current smokers (48%) than ex-smokers (29%) and never-smokers (34%) believed that smoking can help control body weight (table 3).

The respondents' composite knowledge score for the effects of smoking ranged from 0 to 10, with a mean score of 6.54 (SD 2.62). The composite knowledge score of smoking hazards for current smokers ($\bar{x} = 6.83$ (SD 2.07), 95% CI 6.50–7.16) was not significantly different from that of ex-smokers ($\bar{x} = 6.24$ (SD 2.77), 95% CI 5.54–6.94) and never-smokers ($\bar{x} =$ 6.38 (SD 2.63), 95% CI 6.11–6.65) (F ratio = 2.03, df = 2.585, p = 0.133).

PERCEIVED COSTS AND BENEFITS OF SMOKING

Table 4 shows the proportions of ever-smoking and non-smoking respondents' perceptions of smoking consequences if they were to smoke cigarettes daily. A majority of respondents acknowledged an association between regular smoking and the listed negative health consequences. In contrast, any benefits of regular smoking were only expected by a relatively small proportion of cabin crew. Current smokers, more than ex-smokers and never-smokers, emphasized the suggested positive outcomes of smoking such as greater feelings of relaxation; feeling good; more comfortable in groups; more confident; less bored; and believing oneself to be more attractive; more alert, and better able to concentrate. Generally, some responses including feeling good, relaxed, less bored, more alert and better able to concentrate were more emphasized than others. Smokers were three to nine times more likely, and ex-smokers one and a half times more likely, to identify benefits from smoking than never-smokers. Conversely, ex-smokers and non-smokers were up to twice as likely to identify adverse consequences of smoking. Table 5 shows the mean perceived probability that respondents would develop adverse health consequences of smoking if they smoked daily. Current smokers rated this perceived probability significantly lower than did non-smokers.

Table 5 Respondents' estimates of the chance (%) of developing adverse health effects of smoking

	Mean estimated chance % (95% CI)			ANOVA	
Smoking risks	*Current smokers*	*Ex-smokers*	*Never-smokers*	*F-ratio*	*df*
Have lung cancer	55 (50–59)	67 (60–74)[1]	68 (65–71)[1]	12.7	2,558***
Stain fingers/teeth	64 (59–69)	71 (63–80)	76 (73–79)[1]	9.5	2,558***
Shortness of breath	59 (55–64)	64 (56–73)	69 (65–72)[1]	5.0	2,555*
Die at younger age	51 (46–56)	66 (58–73)[1]	68 (64–71)[1]	15.5	2,555***
Addicted to cigarettes	68 (63–73)	72 (64–80)	72 (68–75)	0.7	2,556
Have heart disease	56 (52–61)	63 (55–71)	69 (66–73)[1]	10.7	2,559***
Impaired taste/smell	56 (51–60)	54 (45–63)[2]	67 (64–71)[1]	10.2	2,559***

*$p < 0.05$, ***$p < 0.0005$.
Multiple comparison results (Scheffe Test): [1] significantly different from current smokers at the 0.05 level; [2] significantly different from never-smokers at the 0.05 level

Table 6 Perceived social images of smoking and non-smoking women

		% of respondents rating				
Characteristics	*Respondents' smoking status*	*Smoking women as*	*Non-smoking women as*	*Both smoking & non-smoking women as*	*Uncertain*	χ^2
Feminine	Current	1	21	76	2	61.4***
	Ex	3	37	52	8	
	Never	0	53	42	5	
Attractive	Current	1	15	79	5	36.7***
	Ex	3	32	60	5	
	Never	1	42	52	5	
Impulsive	Current	18	4	61	17	14.6*
	Ex	32	2	49	17	
	Never	33	6	47	15	
Elegant	Current	4	16	74	7	51.5***
	Ex	2	37	55	7	
	Never	2	50	44	4	
Unsophisticated	Current	8	11	64	17	35.0***
	Ex	20	17	42	20	
	Never	20	26	39	15	
Fit	Current	4	48	39	9	23.7*
	Ex	0	68	22	10	
	Never	3	69	24	5	
Sociable	Current	9	3	84	4	15.8*
	Ex	2	13	77	8	
	Never	12	9	73	6	
Adventurous	Current	13	4	74	9	7.6
	Ex	22	7	58	13	
	Never	17	8	67	8	
Free/liberated	Current	20	4	70	6	2.4
	Ex	22	3	67	8	
	Never	24	6	64	7	
Lacking in confidence	Current	13	4	59	24	21.0**
	Ex	28	3	42	27	
	Never	32	2	46	20	

"Current" represents ratings from current smoking respondents
"Ex" represents ratings from former smoking respondents
"Never" represents ratings from never-smoking respondents
Six degrees of freedom for all tests, *$p < 0.05$, **$p < 0.005$, ***$p < 0.0005$

SOCIAL IMAGES OF SMOKING

Overall, very few respondents rated smoking women as feminine, attractive, elegant, or fit (table 6). In contrast, these characteristics were attributed to non-smoking women, on average, one and a half to three times as frequently by non-smoking than smoking respondents, with the exception of "fit". Smoking respondents acknowledged non-smoking women as "fit" compared to smoking women.

Current smoking respondents were significantly more likely to attribute the characteristics of feminine, attractive, and elegant to all women than were ex-smoking and never-smoking respondents. By comparison, smoking women were on average four to five times more likely to be rated as impulsive, adventurous, liberated, and lacking in confidence by all groups of respondents than were non-smoking women. Respondents failed to differentiate smoking from non-smoking women in their attribution of unsophisticated and sociable.

INTERPRETATION OF ADVERTISEMENTS

All three pairs of advertisements were described differently by members of the different smoking groups. With the exception of the alcohol advertisement, the women in non-tobacco advertisements were not perceived differently by smoking and non-smoking respondents. In contrast, a higher proportion of current and ex-smoking respondents generally perceived the women in tobacco advertisements more favourably than did never-smoking respondents.

Descriptions of model(s) depicted in the three pairs of advertisements used were as follows:

First pair of advertisements

The women in the advertisement for alcohol were described by more smoking than non-smoking respondents (smoking status: current *vs* ex-smokers *vs* never-smokers) as having the following attributes:

- feminine (43% *vs* 32% *vs* 31%, $\chi^2 = 6.8$, df = 2, p = 0.033)
- attractive (60% *vs* 55% *vs* 47%, $\chi^2 = 7.4$, df = 2, p = 0.025)
- adventurous (27% *vs* 10% *vs* 26%, $\chi^2 = 8.3$, df = 2, p = 0.016)

A higher proportion of smoking than non-smoking respondents perceived the women in the Kent advertisement as:

- feminine (60% *vs* 48% *vs* 44%, $\chi^2 = 10.5$, df = 2, p = 0.005)
- attractive (72% *vs* 76% *vs* 61%, $\chi^2 = 9.2$, df = 2, p = 0.010)
- sociable (91% *vs* 82% *vs* 81%, $\chi^2 = 6.8$, df = 2, p = 0.033)
- adventurous (38% *vs* 19% *vs* 32%, $\chi^2 = 6.7$, df = 2, p = 0.036)

Second pair of advertisements

The woman in the cosmetic advertisement was not described in significantly different terms by smoking groups. However, the woman in the Virginia Slims advertisement was described differently by smoking and non-smoking respondents in terms of four attributes. More smoking than non-smoking respondents viewed the woman as attractive, elegant, fit, and sociable (current *vs* ex-smokers *vs* never-smokers).

- attractive (77% *vs* 67% *vs* 58%, $\chi^2 = 16.3$, df = 2, p = 0.0003)
- elegant (62% *vs* 51% *vs* 41%, $\chi^2 = 18.9$, df = 2, p = 0.0001)
- fit (21% *vs* 20% *vs* 12%, $\chi^2 = 7.7$, df = 2, p = 0.021)
- sociable (57% *vs* 44% *vs* 44%, $\chi^2 = 7.0$, df = 2, p = 0.031)

Third pair of advertisements

Of the three non-tobacco advertisements, only the woman depicted in the watch advertisement was perceived differently by members of the three smoking status groups as having less desirable attributes. A higher proportion of current smoking than non-smoking correspondents perceived the woman in the watch advertisement as "lacking in confidence", 14% *vs* 3% *vs* 5%: $\chi^2 = 14.1$, df = 2 (current *vs* ex-smokers *vs* never-smokers).

The woman in the Salem advertisement was perceived as attractive, fit, sociable, and adventurous by more smoking compared to non-smoking respondents:

- attractive (67% *vs* 50% *vs* 54%, $\chi^2 = 8.7$, df = 2, p = 0.013)
- fit (39% *vs* 26% *vs* 28%, $\chi^2 = 6.5$, df = 2, p = 0.038)
- sociable (41% *vs* 29% *vs* 26%, $\chi^2 = 11.8$, df = 2, p = 0.003)
- adventurous (54% *vs* 40% *vs* 40%, $\chi^2 = 8.5$, df = 2, p = 0.014)

Discussion

SMOKING BEHAVIOUR

According to the World Health Organisation (WHO), the incidence of smoking has been increasing most amongst professional and urban women, and it is these groups who therefore face "the greatest and most potent threats to health".[7] These young professional women usually occupy administrative and managerial positions and most often take up smoking when at college or university.[1,7] Women who work for multi-national companies, airlines, or the mass media may be more prone to smoking because they are encouraged to emulate their western counterparts in other ways.[7]

A majority of the smoking cabin crew were light smokers compared with smoking women in western countries. However, the former started smoking for the same reasons as do their western counterparts. The most commonly reported reasons why women start smoking are: 1) curiosity,[8–12] 2) the influence of family and peer groups, and 3) to establish or maintain a different self-image. The most commonly identified reasons women continue to smoke are: 1) as a reaction to loss of control over their lives,[13,14] and 2) as a means of mood-control and/or coping with stress.[1,15,16]

REASONS FOR STOPPING SMOKING

Two of the most frequently mentioned reasons why ex-smokers quit are "health reasons" and "relationship" (pregnancy, objecting boy-friend or spouse). Despite the lack of association between some aspects of health knowledge and smoking behaviour, anti-smoking programmes should particularly emphasize the health risks of smoking in relation to reproductive health because of the high premium placed on children as a security for old age in Asian communities.

ATTEMPTS TO STOP SMOKING

The majority of the smokers had attempted to stop smoking at least once. Stopping smoking is not an easy task and women seem to find it especially difficult.[1] Female smokers in Asia may benefit from information on different smoking cessation methods and more support groups and cessation programmes.

BELIEFS ABOUT HEALTH CONSEQUENCES

The survey clearly demonstrates that smoking status is not determined by respondents' knowledge of the health consequences of smoking. Maintenance of, and possibly even recruitment to smoking in this group occurred despite declared knowledge of the health risks. Thus, perceived health consequences alone do not suffice as reasons to change behaviour. Peer influence, self-image, and the perceptions of smoking (eg, as a means to control mood) appear to be more salient factors in predicting smoking behaviour.[8–16]

The low level of responses for "interaction with oral contraceptives" and "every one in six smokers, who smoke one pack of cigarettes daily, will die from smoking-related diseases before the age of 65" indicate that the subjects more readily identify those consequences of smoking which have been most publicised,

such as "lung cancer" and "shorter life expectancy".

About 40% of the subjects believed that smoking would help control body weight. This particular group of young women may use smoking to suppress appetite and to keep themselves slim. The nature of their work may make them over-conscious of their appearance and these effects may help to discourage smokers from quitting.

PERCEIVED EFFECTS OF SMOKING

Overall, smokers generally perceived that the suggested positive results of smoking outweighed the negative health results. This implies that smokers, particularly young smokers, are more likely to focus on more immediate factors than longer term health consequences, as most health problems occur in older age groups and therefore seem distant. Smoking prevention programmes should therefore try to change young people's concept about their vulnerability to the development of smoking-related diseases.

PERCEIVED SOCIAL IMAGES OF SMOKING

The views held by smokers of the characteristics of women as portrayed in tobacco advertisements may have an important impact on the recruitment of young women smokers. Images representing glamour, adventure, sociability, and youthfulness feature strongly and are emphasized by western models, symbolising greater independence. These images may have a powerful impact on many Asian women who may see themselves as less socially liberated. The social status of women in countries such as Korea, Philippines, Thailand, India, Japan, and Malaysia is still much lower than that of men. This is particularly so for Korean and Indian women. Korean cabin crew had the highest smoking rates in our sample. The smoking rates of Philippino and Thai cabin crew are also high. One reason may be that many of these women smoke to enhance their images of independence. However, South Korea, Japan, and the Philippines were exposed to high levels of western, especially American, influence after World War II, and this may have lead to a greater identification with western female role models.

Most respondents attributed the majority of the characteristics to all women and in general were unwilling to distinguish between smoking and non-smoking women. The exception was "fit", which the majority of respondents attributed solely to non-smoking women. However, it is noteworthy that this attribute was accorded by smokers to the women in the Virginia Slims and Salem advertisements. There are some differences in the responses of smoking and non-smoking respondents, but these only apply to a minority of respondents. Among this minority, two general patterns are discernible. First, non-smoking respondents tended to describe non-smoking women as "feminine", "attractive", and "elegant": what might be considered as traditionally desirable elements of the female gender role. Second, there was a tendency for smoking women to be described by all groups of respondents as "adventurous", "liberated", "impulsive", but "lacking in confidence". While "adventurous" and "liberated" are often perceived as desirable characteristics promoted by smoking advertisements, "impulsive" and "lacking confidence" may be less desirable. Emphasis on these associations might help to undermine the pervasive attempts to portray desirable images of women who smoke. Though these interpretations are for a minority of subjects, they do imply that different perceptions of smoking women exist among some smoking and non-smoking subjects. This is an area that would benefit from further research. It seems likely that smokers made fewer distinctions between the images of smoking and non-smoking women, perhaps to minimise negative associations with their own smoking behaviour and to play down potential differences between the social images of smokers and non-smokers. Similarly the non-smoking subjects may have sought to enhance their own social image by choosing the positive aspects of not smoking. This could be exploited by anti-smoking workers to minimise any social desirability associated with images of smoking.

VALIDITY AND RELIABILITY

The under-reporting of smoking prevalence amongst cabin crew raises questions about the validity of responses from employees who are uncertain of their employer's attitude towards smoking. Further research on smoking behaviour should consider ways to avoid or minimise this type of error. Methods such as a brief statement from the participating company emphasising the independent position of the research organisation and the company's supportive views on the study should be explored.

When asked to describe the social images of smoking women, most cabin crew were unwilling to differentiate between smoking and non-smoking women. The distinctions made by the remainder are therefore much weakened. In addition, some cabin crew might not have referred to the definitions provided before responding. Consequently, differing interpretations of the meaning of certain terms may have occurred among subjects. For example, to some subjects "fit" may refer to appearance rather than physical condition. In future research the definition of terms should be juxtaposed with definitive questions and statements, and should limit the choice response to two categories (smoking and non-smoking women) and exclude the category of "all women" to help overcome these problems.

Conclusions

In this study population, smokers and non-smokers differed in their perceptions of the utility of smoking and in their estimation of risks from smoking. Smokers reported more

benefits from smoking and were also more likely to identify with women depicted in tobacco advertisements than were non-smokers. However, the levels of knowledge of health risks from smoking were similar for both smokers and non-smokers. This suggests that health risks play little part in discouraging smoking among this population. To influence smoking in female cabin crew, we need to focus on changing the perceived benefits of smoking. There is also a need to increase young women's awareness of the subtle influences of tobacco advertising on social image formation.

POSSIBLE INTERVENTIONS

The results of this study suggest several strategies:

- Increase access to information on means for lifestyle change, including methods for body weight control.
- Establish the teaching of stress management to deal more effectively with occupational and personal stress.
- Emphasise negative social aspects of smoking.
- Promote desirable images of not smoking.
- Reinforce health promotion in the work place.
- Initiate a programme to reduce recruitment to smoking among new cabin crew.
- Establish more smoking cessation courses to help smokers to stop and provide advice and help to smokers during the smoking cessation process.
- Ban all tobacco advertisements which seek to associate glamorous or socially desirable images of women with cigarettes or other tobacco products.
- Initiate further research to clarify the benefits of emphasis on health as a method of analysing smoking behaviour. Where health emphasis occurs, it may be effective to focus on the improvement in female reproductive health to be gained from smoking cessation in addition to respiratory and cardiovascular health, especially for younger age groups.
- Promote non-smoking working environments to help smokers to stop. Since this study began the airline has introduced many non-smoking flights, including some long-haul routes. There is growing concern among cabin crew about the health effects of environmental tobacco smoke in aircraft. A world-wide ban on smoking in passenger aircraft is an important goal for the protection of the health of airline employees.

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Physician-delivered smoking cessation advice: issues identified during ethnographic interviews

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Abstract

Objective **– To identify the factors that physicians believe impair their ability to provide smoking cessation advice to their patients.**

Design **– Ethnographic interviews of physicians.**

Setting **– Non-academic primary care practice.**

Subjects **– 18 of 27 physicians who had recently participated in the intervention group of a randomised clinical trial to increase the rate at which physicians give smoking cessation advice.**

Main outcome measures **– Factors that the interviewees reported were affecting their ability to give smoking cessation advice.**

Results **– The interviews generated 439 statements that we sorted into 19 categories. We judged 10 of the categories to be statements about medical practice and smoking in general, and nine of the categories to represent barriers to giving smoking cessation advice. The barriers described by the interviewees included: lack of patient interest, lack of physician perceived self-efficacy, lack of time, lack of organisational support, lack of reward to the physician, lack of peer support, lack of staff support, and lack of interest on the part of the physician. The commercial promotion of tobacco was also identified as a barrier to giving smoking cessation advice.**

Conclusions **– As reported by physicians who had participated in a trial to provide smoking cessation advice in their own practices, the barriers to giving smoking cessation advice are more than a lack of knowledge that smoking is a health hazard and the lack of skills to help the patient stop smoking. These additional barriers may need to be addressed if physicians are to improve the rates at which they identify their patients who smoke and assist them in quitting.**

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Introduction

The discussions of smoking in a sample of the textbooks that are used by primary care physicians focus on two themes: smoking as a threat to health and the basic skills that can help the patient stop smoking.[1–5] Even the specialty textbooks on preventive medicine and monographs addressed to the practicing physician tend to be limited to these two issues.[6–8]

In a fashion similar to the textbooks, we originally designed the Doctors Helping Smokers trial (R01 CA38361) around the hypothesis that raising physician awareness about the hazards of smoking and offering to teach them additional intervention skills would be sufficient to recruit them to attend a skill-building session. We also hypothesised that the skill-building session in turn would increase the rates at which the physicians gave advice and would increase the smoking cessation rates among their patients who smoked.[9] The recruitment component focused on the individual physician,[10] and the skill-building component centred around urging the physicians to identify all of their patients who smoked and to convince them to stop smoking.[9]

The intervention did not produce the intended effects. Regardless of the recruitment materials we used, we were only able to recruit 66 physicians out of a population of more than 1000[10] and, even though the physicians who participated in the trial promised that they would identify all smokers among their patients and ask them to stop smoking, little more than half of these smokers reported that they had been asked to quit.[9] The participating physicians acknowledged that they were frequently unable to follow through on their goal to give smoking cessation advice to every patient who smoked.

In order to understand better why our trial failed, we followed the suggestions of experts on hypothesis generation[11] and action science[12] and conducted ethnographic interviews[13] with 18 of the physicians who had participated in the trial. These interviews led us to reformulate our hypothesis to include attention to organisational and sociological factors as necessary components of a physician intervention programme.[14,15] The broader hypothesis produced a more successful outcome.[16] This paper reports the methods and findings of the ethnographic interviews.

Methods

The pool of potential interviewees for this project was the 27 physicians who had participated in the intervention group of Round I of Doctors Helping Smokers.[9] However, four physicians were not available during the week that the ethnographer (DGW) was in the area, and one was not scheduled for an interview

because she lived in a very remote region. Since we only had time to interview 20 physicians and we wished to focus on private practitioners, a physician who worked at a state mental hospital and a physician who worked at the University of Minnesota were not scheduled for interviews.

The ethnographer was unable to complete two scheduled interviews. One interview was not completed because travel time between interviews had been underestimated, and one interview was not completed because the ethnographer was unable to find the doctor's office. Interviews were completed with 18 physicians, two-thirds of the original pool.

To conduct the interviews, we used a minimally structured ethnographic format.[13,17] Four physicians were interviewed as pairs, and the 14 remaining physicians were interviewed as individuals. Each interview lasted up to one hour. In order to stimulate the physicians to reflect on their experiences, we asked them how they viewed their practices, how they thought medicine was changing, and what barriers they faced when trying to provide patients with smoking cessation advice and services. We tape recorded all interviews in their entirety.

After completing the interviews, we transcribed the tapes into a computer file and broke the interviews down into statements that each represented a single complete thought. We assigned a random identification number and the identification number of the physician who made the statement to each of these statements. We then printed each statement onto a 3×5 inch note card along with its randomly assigned identification number; the identification number of the physician making the statement did not appear on the card.

Two of us (TEK and LIS) independently sorted the cards into groups that we felt contained statements with similar meanings. We assigned two group identification numbers to each statement, one for the group assignment of each sorter. We cross-referenced the groups created by the two sorters to create categories of statements. We defined a "category" as three or more statements identified as a group by both sorters. To reduce the number of categories, the two sorters reviewed the categories and combined those that they thought represented an identical construct.

Results

The interviews with the 18 physicians generated 439 statements. The number of statements per physician ranged from seven to 47. No physician made a statement implying that they did not consider smoking to be an important problem. Only one physician made a statement implying that they lacked intervention skills.

One sorter created 68 groups from the statements, and one sorter created 62 groups. The second sorter identified 25 statements that he felt did not fall into any group. Forty-four of the groups from each sorter met the criterion of a "category" as defined above. These 44 categories contained 259 statements; 180 statements did not fall into clusters that met the criterion of a category. Upon further examination, the two sorters felt that the original 44 categories could be further reduced in number to 19 categories without any loss of information.

On the basis of their content, we judged that 137 statements in 10 categories represented statements about medical practice in general, statements about why people quit smoking, and statements about giving smoking cessation advice (table 1). More than half of the physicians made statements to the effect that medical practice was changing in negative ways. While the most frequent statements about smoking were about how the physicians counselled smokers, two-thirds of the doctors made statements that appeared to express that they were confused about why people stop smoking. Other statements referred to tools that the physicians said they used to help their

Table 1 Categories of statements not identified as barriers to giving advice

Categories (with example statements below)	*No. of statements made*	*No. of physicians making statements*
Ways to talk to smokers "I always tell them that I used to smoke... it helps a lot"	49	13
Confusion about why people quit smoking "we do not know how cold turkey works"	25	12
Negative changes in the practice of medicine "there is a lot of moving around [between HMOs]"	21	10
Concrete tools to give help "we have a sign in the office that says: 'if you want to stop smoking, ask us!'"	12	6
The helpfulness of Doctors Helping Smokers "DHS helped... I am proceeding with considerably more optimism now with my patients"	9	9
The importance of systems "[I am] trying to label my charts: smoker, non-smoker, given book, etc,"	6	4
Ongoing smoking control activities "we are talking about a smoke-free clinic – we are serious about getting it out of here in a year"	4	3
Positive changes in social expectations about tobacco use "the drug store took out all tobacco products recently... [it] surprised us"	4	3
The importance of waiting until the smoker is ready to quit "you need to 'hit' people when they are ready"	4	3
The slowness of the physician's learning process "it takes about 5 years to become reasonably effective as a doctor"	3	2

Table 2 Categories of statements referring to barriers to giving smoking cessation advice

Categories (with example statements below)	*No. of statements made*	*No. of physicians making statements*
Lack of patient interest "no one hears me"	35	12
Low perceived self-efficacy "I have had some success – but the numbers are small"	33	15
Lack of time "The pace of everyday practice is a problem..."	18	12
Lack of follow-up and feedback system "No statistics at all on how many of my patients quit because of me"	12	6
Lack of reward (financial or emotional) "immediate rewards are rarely there" "they will not pay for it"	9	6
Lack of staff support "staff who smoke in the office – an ongoing battle..."	5	4
Lack of collegial support "My colleagues do not value it"	5	2
Commercial promotion of tobacco "Newspapers get a lot of cigarette money"	4	3
Lack of personal interest "I like to see really sick people where you get the rewards from scientific type things"	4	2

smokers stop smoking, testimony that Doctors Helping Smokers was helpful to them, and statements about what the physicians were trying to do to help their patients stop smoking.

We judged that 125 statements referred to nine categories of barriers to giving smoking cessation advice (table 2). Two-thirds of the statements about these barriers referred to lack of patient interest in the advice, a feeling that advice is not effective, and a lack of time to give advice. Two-thirds of the physicians made statements referring to each of these categories. The remaining statements described problems with lack of follow-up and feedback, lack of reward, lack of staff and collegial support, commercial promotion of tobacco, and a lack of interest in giving smoking cessation advice. Statements in each of these categories were made by one-third of the physicians or fewer.

Discussion

In the process of programme development, the objective needs and subjective wants of the target population, the physical and social environment into which the programme is to be introduced, and the efficacy of the programme must each be assessed. The best way to collect the assessment data is dependent on the nature of the assessment task. Ethnographic methods are particularly useful when collecting data about subjective wants and social environments. While data collected in this fashion can be ambiguous and open to differences in interpretation, they are more likely than structured questionnaire data to identify previously unrecognised concerns of the subjects for whom a programme is being developed.[18]

In 16 interviews, the 18 physicians who participated in this study made 439 statements about medical practice and the factors that affect their ability to give smoking cessation advice. The two most frequently mentioned categories related to experienced-based and empathy-based issues. Two-thirds of the interviewees spontaneously told us that they felt that their patients were not interested in hearing a smoking cessation message, that they felt that their intervention was not effective, and that they had trouble finding time to intervene. In addition, a minority reported that they had trouble giving follow-up advice, that they were not rewarded when they advised smokers to quit, that they felt they lacked the support of their colleagues and their staff, and that they were discouraged by the commercial promotion of tobacco. Finally, a few physicians told us that they simply lacked the personal interest to intervene.

Lack of time,[19–21] concern about patient acceptance,[21–22] perceived lack of benefit,[23] inadequate reimbursement,[19,22,24] physician overestimation of performance,[25–31] and lack of organised practice support[32–36] have all been described previously as barriers to the delivery of preventive services. However, nearly all of these studies were conducted in academic medical clinics.

While none of the barriers that we and others have identified were addressed in the textbooks and monographs that we found in a family practice reference library,[1–8] experts in technology transfer suggest that an innovation must address the needs of the target population if it is to be adopted.[12,37–39] Ethnographic research helps to define those needs by elucidating the perceptual and social environment of the interviewee. In the case of health services delivery, medical sociologists and anthropologists have observed that physician behaviour is influenced as much by the organisational context of medical practice as by the scientific basis.[40–43]. We integrated these principles with hypotheses generated from our interview data to design Round III of Doctors Helping Smokers, a systems-based intervention that significantly increased smoking cessation advice by a group of non-volunteer, non-academic, private practitioners.[16] Addressing the organisational and sociological factors of medical practice has produced success for other health services interventions, too.[44–48]

While physician advice to stop smoking is both effective and cost-effective,[49,50] physicians have failed to respond to these facts by increasing the rates at which they give advice to stop smoking.[51,52] The data presented here suggest that there are broader issues to be

addressed if we are to increase the extent to which practicing physicians deal with smoking among their patients.

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Tobacco excise taxes and rates of smokeless tobacco use in the US: an exploratory ecological analysis

Robert L Ohsfeldt, Raymond G Boyle

Abstract

***Objective* – To determine the association between state tobacco excise tax rates and the rate of smokeless tobacco use in the US.**

***Design* – A single cross-section of state level data for 1985 are used in a multivariate regression model controlling for ability to pay, educational attainment, consumer preferences, and state tobacco regulation.**

***Results* – State-level prevalence of smokeless tobacco use among males 16 and older ranged from 23.1% in West Virginia to less than 1% in several states including Connecticut, Hawaii, and Massachusetts. The multivariate results indicate that higher excise taxes applied to smokeless tobacco products are associated with lower rates of smokeless tobacco use among males aged 16 and older, holding other factors constant. In addition, higher cigarette tax rates are associated with higher rates of smokeless tobacco use, holding smokeless tobacco excise tax rates and other factors constant.**

***Conclusion* – Tax-induced relative price changes could be one factor among a multitude of factors affecting the growth in smokeless tobacco use among young males in the 1980s. Increases in smokeless tobacco excise tax rates may be an important part of a comprehensive effort to reduce the use of smokeless tobacco.**

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Introduction

The term smokeless tobacco was coined by the tobacco industry to represent snuff and chewing tobacco as safer alternatives to smoking cigarettes. Similar to smoking, moist snuff and chewing tobacco are intended to be used orally. Moist snuff products are finely ground tobacco placed between the lip and gum (gingival groove). Chewing tobacco is sold in loose leaf, plug or twist forms, and a user places a bolus of tobacco inside the cheek.

The prevalence of smokeless tobacco use in the US has been increasing, particularly among young males.[1] This growth has been tied to the intensive marketing of moist snuff toward young males. From 1970 to 85, the percentage of males aged 16–19 years using moist snuff increased by ninefold from 0.3% to 2.9%. For all smokeless tobacco products, prevalence of use among this age group increased from 1.4% to 5.9% (figure 1).[2] Among older males (aged 20 and older), the prevalence of use increased by 16%, from 4.9% to 5.7%. By 1991, about 5.6% of males aged 18 and older used smokeless tobacco.[3] Consumption behaviour favouring moist snuff products presents serious cancer and oral pathology risks.[4]

In contrast, the prevalence of cigarette smoking in the US has been decreasing. From 1970 to 85, cigarette smoking declined by 27% among male smokers aged 16–19 years and among males aged 20 and older smoking declined by 25%, from 44.3% to 33.2% (figure 1). By 1991, about 28.1% of males aged 18 and older smoked cigarettes.[5]

A number of factors have contributed to the decline in smoking prevalence. Among these factors are various federal and state policies to control access to tobacco products. Excise taxes represent an indirect control measure in that the higher prices caused by taxes make tobacco products less affordable. Past studies have indicated that higher prices, created in part by increases in federal and state cigarette taxes, reduce cigarette consumption.[6–10] The most dramatic evidence of this effect is from Canada, where excise tax increases in the 1980s contributed to steep increases in retail cigarette prices – until recent tax roll-backs, cigarette taxes represented about 75% of the retail price of cigarettes in Canada. Per capita cigarette consumption declined in Canada over this period more rapidly than in the US.[11]

Considerable attention has been given to increasing excise taxes on products such as alcohol and tobacco as a means of health promotion.[12] In 1985, compared to cigarette excise taxes, excise taxes applied to smokeless tobacco products were low – there was no federal excise tax on smokeless tobacco and only 21 states levied an excise tax on smokeless tobacco products. From 1985 through 1993, 22 states raised or implemented excise taxes on smokeless tobacco products. The federal excise tax rate now is 2.8 cents per 1.2 oz can of snuff and 2.4 cents per 3 oz pouch of chewing tobacco. Although it is plausible to speculate that higher smokeless tobacco excise taxes will reduce the use of smokeless tobacco, no published study has attempted to verify the effect empirically. The objective of this study was to estimate the association between state

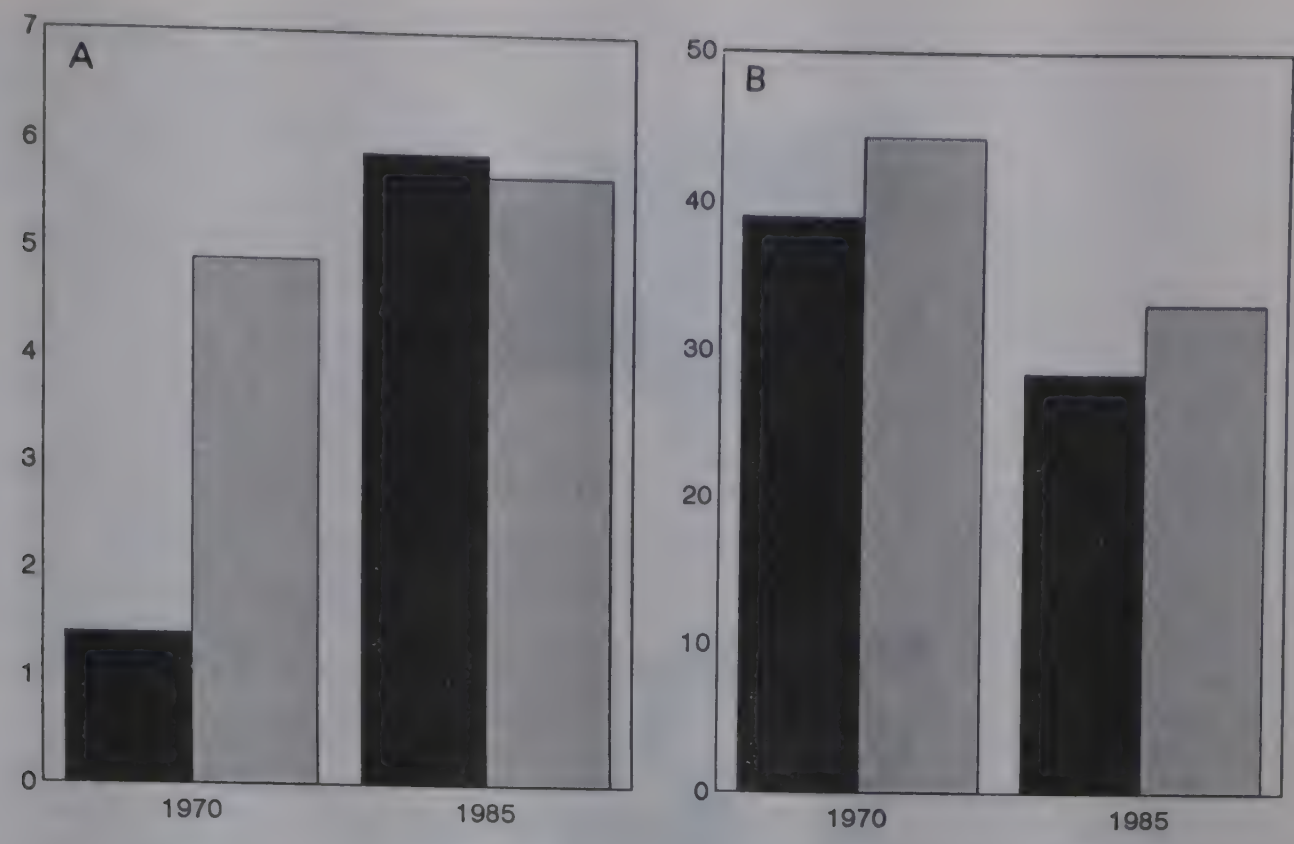

Figure 1 Percentage of US males using tobacco by type of tobacco and age group; (A) cigarettes, (B) smokeless tobacco. Black: age 16–19 years; grey: 20 or over.

smokeless tobacco excise tax rates and the rate of use of smokeless tobacco using a single cross-section of state-level data for 1985.

Methods

To isolate the association between tobacco excise tax rates and use rates, a multivariate regression model was used to control for other factors in states hypothesised to affect the prevalence of smokeless tobacco use among males aged 16 and older. All analyses were performed using the statistical software package SAS. The alpha level for data analysis was set at 0.10; thus statistical differences were declared significant at $p < 0.10$.

DEPENDENT VARIABLES

Three measures of smokeless tobacco use were used as dependent variables in the empirical model: *a*) the prevalence of snuff use; *b*) the prevalence of chewing tobacco use; and *c*) the prevalence of use of either form of smokeless tobacco. These data were obtained from Marcus *et al*, who derived state-level use prevalence rate estimates from the September 1985 Current Population Survey (CPS).[2] Although these data now are somewhat old, more recent data are not available. (The public use version of the data file for the National Health Interview Survey does not indicate state of residence.) The prevalence measures are expressed in terms of their natural logarithms to reduce cross-sectional heteroskedasticity. The CPS only provides data for any level of use, not the intensity of use among those using smokeless tobacco products. Thus, only the first-part of a standard two-part demand model can be estimated using the CPS data. Smokeless tobacco use at any level may be less responsive to economic control variables (eg, taxes) than the intensity of use among users. However, the factors predicting complete absence of use may be of greater policy relevance than factors incrementally reducing the intensity of use.

INDEPENDENT VARIABLES

The selection of independent variables included in the empirical model is based in part on the economic literature examining the effects of cigarette taxes on cigarette demand.[6,7] Independent variables are grouped in the following categories:

State excise taxes on tobacco

All states had a special excise tax on cigarettes in place in 1985, but only 20 states had special excise taxes applied to snuff and 21 states had excise taxes for chewing tobacco (figure 2).[13] It is likely that state excise taxes on smokeless tobacco products have some impact on the demand for these products, as higher taxes are passed on to consumers as higher prices. Four measures of state tobacco excise taxes are used in the model. Three of these correspond to the three measures of smokeless tobacco use: *a*) the excise tax rate for snuff; *b*) the excise tax rate for chewing tobacco; and *c*) the weighted average of the two tax rates as a "smokeless tobacco" tax rate measure. All of these tax rates are expressed as a percentage of the wholesale price of the product. The state excise tax per pack of cigarettes, adjusted for differences across states in general price levels, also is included to capture any cross-tax effects.

To account for the impact of possible border crossing for purchases of tobacco, border-state adjusted excise tax rate measures are constructed for each state. For each of the four excise taxes, the border-state adjusted tax rate for each state is the weighted average of the state's tax rate and the minimum of the state's tax rate and the tax rate in a neighbouring state, across all neighbouring states. The weights are the percentages of a state's population living within 20 miles (about 32 km) of

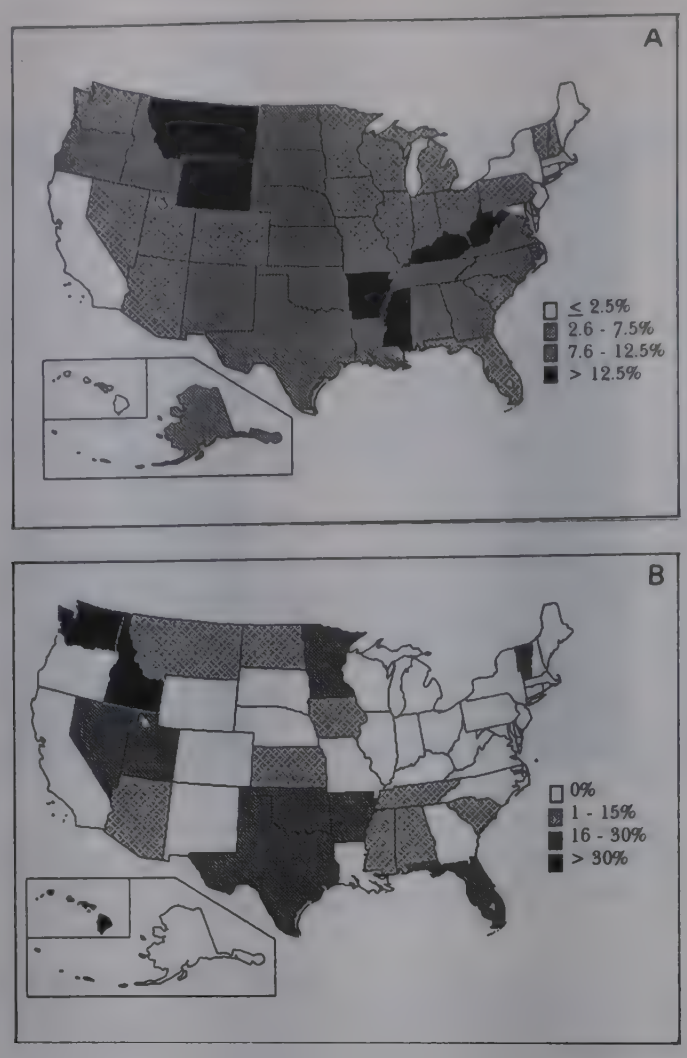

Figure 2 (A) Prevalence rates of smokeless tobacco use in the US, males aged 16 years and older, 1985; (B) chewing tobacco excise tax rates in the US as a percentage of wholesale price, 1985.

the border of each bordering state, with a residual weight for the percentage of the population not within 20 miles of any other state. The "minimum" operator is used because border-crossing behaviour, if present, is expected to be dominated by crossing from a high-tax state into a nearby low-tax state to purchase the tobacco product at a lower price, not *vice versa*. Thus, the border-adjusted average excise tax rates for some states are lower than the state's actual tax rate, but the adjusted tax rate is never higher than the actual rate. The model does not account for local (city or county) tobacco tax rates.

Ability to pay

Per capita personal income, adjusted for differences across states in general price levels, is used to capture the ability to pay for tobacco and other products. Higher income would be associated with greater demand for smokeless tobacco products, other things the same, if smokeless tobacco products are normal goods (in the economic sense of the term "normal good"). Higher income would be associated with lower demand if smokeless tobacco products were inferior goods (again in the economic sense of "inferior good").

Education

Educational attainment is often used in economic models of health behaviour as a technological factor in an individual's production of health.[14] The notion is that education improves the efficiency of an individual's use of health information and choices affecting health. This implies that greater educational attainment reduces the likelihood that an individual engages in unhealthy behaviours, such as smokeless tobacco use. Alternatively, low educational attainment may be related to a high rate of time preference across individuals. An individual with a high rate of time preference may be more likely than others to engage in behaviour that generates current satisfaction at a future cost. In either case, higher educational attainment is expected to be associated with a lower rate of smokeless tobacco use. The percentage of the population aged 25 or older who are high school graduates is included in the empirical model as a measure of average educational attainment.

Consumer preferences

Several characteristics of a state's population are included in the model to capture systematic differences in consumer preferences for smokeless tobacco products. Residence in a southern state often is cited as a risk factor for smokeless tobacco use.[2] A binary variable equal to one for southern states thus is included in the model. Since white males are thought to be at greater risk than black males[2], the percentage of the male population 16 and older who are black is included in the model. Fundamentalist Protestant denominations generally have a negative view of tobacco use. Variables indicating the percentage of the population who are adherents to fundamentalist Protestant denominations and the percentage of the population with no active religious affiliation thus are included in the model.[15,16] The divorce rate, which is often used as a measure of stress in smoking studies, also is included. Finally, a preference for smokeless tobacco use may be associated with outdoor activity. The percentage of the state population age 16 or older who hunted or fished in 1985 is included to account for this possibility.[17]

State tobacco use regulation

At least some studies indicate that state laws restricting smoking in public places reduce the demand for cigarettes.[9,10] Such laws could encourage the use of smokeless tobacco in place of smoked tobacco products, if smokeless tobacco use were not covered by the laws, if smokeless tobacco use were more difficult to detect, or if laws as they apply to smokeless tobacco were less strictly enforced. Pertschuck and Shopland summarise, by state, the presence of statutes restricting smoking in 17 general categories of public places.[18] (No such compilation is available concerning state laws restricting the public use of smokeless tobacco.) The small sample size available for the empirical analysis and multicollinearity prevented the use of numerous binary variables for various types of smoking restrictions in the regression model. Cluster analysis was used to determine if state tobacco laws could be coded into a binary variable indicating the presence of more restrictive laws. The 17 categories of

places covered by state laws were coded as variables indicating the presence or absence of regulation in each of the 17 areas. A single linkage or nearest-neighbour method of agglomerative clustering was used. Cases and clusters with the shortest euclidian distance were combined until a single cluster was formed. The results indicated that a binary classification was appropriate. A binary variable equal to one for states in the restrictive cluster is included in the empirical model. The model does not account for local laws restricting smoking, which generally are more restrictive than state laws.

A final independent variable is the percentage of the male population aged 16 or older who were aged 16–17 in 1985.[19] Such individuals may have reduced access to smokeless tobacco products relative to older males due to laws prohibiting sales to persons under the age of 18. Although enforcement is notoriously lax, these laws could reduce the use of smokeless tobacco among this age cohort relative to older males. On the other hand, age may be related to personal preferences for smokeless tobacco. If the youngest males have a greater preference for smokeless tobacco than older males, the impact of any reduced access related to age could be obscured.

ESTIMATION ISSUES

To determine the effect of smokeless tobacco excise taxes on smokeless tobacco use, the possibility that the size of the excise tax is affected by the level of use (ie, the tax rate is endogenous for the use rate) should be considered. A Hausman test for the null hypothesis that each of the excise tax rate variables is not correlated with the error term in the use rate regressions rejected the null hypothesis ($p < 0.01$) in each case.[20] Thus, an instrumental variable (IV) approach was used to purge the correlation between the excise tax variables and the error term in the smokeless tobacco use equations.[20] Each of the tax rate variables was regressed on a series of state-level variables including all of the variables listed above and the following variables: percent metropolitan population, unemployment rate, indices of political liberalism and interparty political competition, *per capita* state government tax revenues, and the size of age groups among males age 16 and older, as shown in Appendix I. Note that in the reduced-form models of state tobacco excise tax rate determination, greater liberalism is associated with higher tax rates for both cigarettes and smokeless tobacco products. Higher educational attainment among a state's population is associated with higher smokeless tobacco taxes but not higher cigarette taxes. Higher *per capita* income in a state is associated with higher cigarette taxes but income has no statistical association with smokeless tobacco excise taxes.

Some past studies suggest that state smoking laws may be endogenous for rates of cigarette smoking (ie, states with a low prevalence of cigarette smoking may more readily adopt laws restricting smoking).[7,21] However, the smoking law variable is treated as exogenous for smokeless tobacco use since a Hausman test could not reject the null hypothesis of zero correlation between the smoking law variable and the error term in the smokeless tobacco use equations.

A well-known problem is that the CPS data contain a number of proxy responses for tobacco use, particularly for teenagers.[2] Although all surveys eliciting self-reported tobacco use measure use with error, there is the potential for more substantial under-reporting of use by proxy respondents. Despite the error in the CPS measure of smokeless tobacco use prevalence, estimates of the effects of variance in taxes on variance in prevalence of smokeless tobacco use may be unbiased if response error is uncorrelated with tax rates or other variables in the demand model. It is possible that proxy response bias accounts in part for the apparent endogeneity of smokeless tobacco tax rates for reported smokeless tobacco use. If so, the IV approach employed in the analysis should serve to purge the effects of systematic proxy response bias from model estimates of the excise tax coefficients.

Finally, the relatively small sample size requires the use of a parsimonious model specification. Alternative model specifications were estimated to assess the sensitivity of the estimated excise tax coefficients to the choice of regressors used in the model.

Results

Results for two specifications of the model for each of the three measures of smokeless tobacco use are reported in table 1. The second specification of each use rate model (Model B) excludes the restrictive public smoking law variable and other variables in the full model (Model A) that were not statistically significant in any of the three use-rate equations. Standard error estimates are reported in parentheses below the estimated coefficients. A description of and sample means for the model variables can be found in Appendix II.

MOIST SNUFF AND CHEWING TOBACCO TAXES

Regarding the use of snuff, in the full model (Model A), the estimated coefficient of the snuff tax variable is negative and statistically significant ($p < 0.1$). The point estimate becomes larger in magnitude and precision improves ($p < 0.01$) when the abbreviated model specification is used (Model B). Evaluated at sample means, the tax elasticity of snuff prevalence (ie, the percent change in the use rate given a 1% change in the tax rate), is about -0.4 to -0.6 (table 2). Recall, however, that both the snuff use rate and snuff excise tax rate are expressed as percentages. Thus, a 10% increase from the mean excise tax rate (from 8.0% to 8.8% of the wholesale price) is associated with a reduction in the snuff use prevalence rate of about 4% to 6% (ie, from 1.9% users to 1.82% or 1.78% users), other things constant.

Table 1 Estimates of state-level prevalence of use of snuff and chewing tobacco among males aged 16 years or more, 1985

	log (snuff)		*log (chewing tobacco)*		*log (any smokeless)*	
	Model A	*Model B*	*Model A*	*Model B*	*Model A*	*Model B*
Intercept	5.93[b]	5.27[b]	3.59[c]	3.75[b]	4.68[b]	4.64[a]
	(2.61)	(2.14)	(1.89)	(1.53)	(1.88)	(1.52)
Snuff tax	−5.62[c]	−8.40[a]	—	—	—	—
	(3.26)	(2.15)				
Chew tax	—	—	−8.39[a]	−7.39[a]	—	—
			(2.24)	(1.61)		
Smokeless tax	—	—	—	—	−7.29[a]	−7.35[a]
					(2.28)	(1.58)
Cigarette tax	2.45[c]	3.87[a]	3.09[b]	2.37[a]	2.79[b]	2.58[a]
	(1.55)	(1.15)	(1.18)	(0.91)	(1.16)	(0.87)
Per capita income	−0.067[c]	−0.11[a]	−0.075[a]	−0.072[a]	−0.073[a]	−0.081[a]
	(0.036)	(0.02)	(0.025)	(0.017)	(0.025)	(0.016)
High school graduate (%)	−0.039	—	0.010	—	−0.003	—
	(0.036)		(0.024)		(0.024)	
Fundamentalist (%)	0.027	0.036[b]	0.053[a]	0.042[a]	0.042[c]	0.037[a]
	(0.021)	(0.016)	(0.015)	(0.012)	(0.022)	(0.012)
No religion (%)	0.022	0.029[b]	0.039[a]	0.032[a]	0.032[a]	0.030[a]
	(0.015)	(0.011)	(0.011)	(0.008)	(0.014)	(0.008)
Southern states	0.16	0.32	0.68[b]	0.61[a]	0.49	0.52[a]
	(0.48)	(0.27)	(0.34)	(0.19)	(0.35)	(0.19)
Smoking laws	−0.18	—	−0.19	—	−0.21	—
	(0.25)		(0.18)		(0.18)	
Hunt/fish (%)	0.062[a]	0.057[a]	0.053[a]	0.054[a]	0.057[a]	0.056[a]
	(0.014)	(0.011)	(0.009)	(0.008)	(0.010)	(0.008)
Divorce rate	0.044	—	−0.043	—	−0.015	—
	(0.069)		(0.048)		(0.049)	
Males 16–17 (%)	−9.92[b]	−1.18[a]	−1.09[a]	−0.92[a]	−0.99[a]	−0.94[a]
	(0.45)	(0.38)	(0.33)	(0.29)	(0.33)	(0.28)
Males Black (%)	−0.029	—	−0.005	—	−0.009	—
	(0.023)		(0.017)		(0.017)	

Note: Estimated standard errors for coefficients are indicated in parentheses. Model B excludes variables not statistically significant in Model A for any of the smokeless tobacco use measures.
[a] $p < 0.01$; [b] $p < 0.05$; [c] $p < 0.10$.

Table 2 Estimated tax elasticities of smokeless tobacco product use prevalence, 1985 sample means

Tax	*Snuff*	*Chew*	*Any smokeless*
Snuff	−0.41	—	—
	[−0.61]		
Chew	—	−0.63	—
		[−0.56]	
Smokeless	—	—	−0.55
			[−0.55]
Cigarette	0.39	0.49	0.44
	[0.62]	[0.39]	[0.41]

Note: Elasticity estimates reported in parentheses are calculated from Model B in table 1.

Similarly, in the chewing tobacco use model, the estimated coefficients of the state chewing tobacco excise tax rate (table 1, columns 3 and 4) are negative and significant ($p < 0.01$) in both model specifications. The point estimate of the tax elasticity (at means) is about −0.6 (see table 2). Finally, in the combined smokeless tobacco use model, the estimated coefficient of the constructed smokeless tobacco excise tax rate is negative and significant ($p < 0.01$) in both model specifications (columns 5 and 6). The estimated smokeless tobacco tax elasticity is about −0.55, implying that a 10% increase in the smokeless tobacco tax rate would reduce smokeless tobacco use rates by about 5.5% (see table 2).

CROSS-TAX EFFECTS

In terms of cross-tax effects, the estimated coefficient of the cigarette excise tax variable is positive and statistically significant ($p < 0.1$) in all of the models presented in table 1. The point estimate of the cross-tax elasticity is about 0.4 to 0.6 for snuff use rates (see table 2). This implies that a 10% increase in the cigarette excise tax rate would be expected to result in a 4% to 6% increase in snuff use rates. For the chewing tobacco use models, the point estimates indicate a cross-elasticity for chewing tobacco use of about 0.4 to 0.5 (see table 2). The estimated cross-tax effects are similar in magnitude in the combined smokeless tobacco use model.

OTHER VARIABLES

Regarding other model variables, higher *per capita* income is associated with lower rates of smokeless tobacco use, suggesting that smokeless tobacco is an inferior good. Residents of southern states are more likely than residents of non-southern states to use chewing tobacco. States with a relatively large percentage of fundamentalist Protestant population have higher rates of chewing tobacco use, as do states with a relatively large percentage of population with no active religious affiliation. Higher rates of hunting and fishing are associated with greater use of smokeless tobacco. Of course, these associations could represent ecological fallacy (eg, a high percentage fundamentalist population may be associated with a greater rate of use across states, but among individual residents of each state a fundamentalist may be less likely than others to use). The smoking law variable, when included in the model, is not associated with the use of smokeless tobacco products. The same lack of association is evident for the divorce rate, high school graduation rates, and the percentage of the state's male population that is black. Finally, states with a relatively large share of males 16 and older in the 16–17

year age group have lower rates of chewing tobacco use. This could reflect the impact of access restrictions, or it could simply be an artifact of the reporting bias associated with proxy respondents for adolescents (recall however that the use prevalence measures in the model exclude males under 16).

Discussion

The results indicate that higher excise taxes on smokeless tobacco products are associated with lower rates of smokeless tobacco use, holding other factors constant. The magnitudes of the implied tax effects on use rates generally are consistent with the effects of cigarette prices on cigarette use found in past studies. Keeler et al[9], using monthly cigarette sales for California during 1980–90, conclude that the price elasticity of cigarette demand was −0.4 to −0.6, depending on the specification of the model. Using state-level sales data pooled over time, Baltagi and Levin[6] and Chaloupka and Saffer[7] find cigarette demand price elasticities of −0.2 and −0.3, respectively. Similarly, Wasserman *et al*,[10] using self-reported cigarette use data from the National Health Interview Surveys, conclude that the cigarette price elasticity was about −0.3 among adults in the late 1980s. Becker *et al*[22] conclude the price elasticity of cigarette demand is about −0.75, if the long-run effect of price changes on cigarette use is taken into account.

Although the smokeless tobacco excise tax elasticities reported here correspond to the high end of past cigarette demand price elasticity estimates, it should be noted that our model uses state excise taxes rather than prices, since state-level retail prices for smokeless tobacco products are not available. If differences in excise taxes translate directly to proportionate differences in retail prices, the price elasticity should be somewhat higher than the tax elasticity, because taxes paid per unit are but one component of the full retail price (ie, a particular tax increase representing a 10% increase in the tax rate represents much less than a 10% increase in retail price). Thus, our results suggest that smokeless tobacco demand is at least as responsive to its own price as cigarette demand. State laws restricting public smoking do not appear to affect rates of smokeless tobacco use.

The model estimates also imply that raising cigarette excise tax rates will increase the rate of use of smokeless tobacco, holding smokeless tobacco tax rates constant. The estimated cross-tax effects are not trivial in magnitude, particularly in light of large increases in federal and state cigarette excise tax rates over the past decade, and the magnitude of tax increases that have been proposed for the future. Although the magnitudes of the cross-tax elasticities in part are due to the small "base" of smokeless tobacco use (ie, a small increase from nearly zero is a large percentage increase), it is possible that the cross-tax effects would be even more substantial if the model accounted for the quantity of smokeless tobacco products used, not just the presence or absence of any level of use. Indeed, about a quarter of adults who used smokeless tobacco in 1991 also smoked cigarettes.[5] On the other hand, the estimated cross-tax effects may be inflated if there are factors affecting smokeless tobacco use correlated with state cigarette excise tax rates not accounted for in the model. However, it is unlikely that such unmeasured confounding factors would completely eliminate a cross-tax effect.

The apparent magnitude of the cross-tax effect may reflect the dominant presence of young males among smokeless tobacco users – particularly snuff.[2] In other words, if the demand for cigarettes among young males is more responsive to changes in cigarette prices, the cross-price effect of cigarette price increases on smokeless product demand also may be larger in magnitude for young males than for other persons. Lewit *et al*[23] conclude that the price elasticity of cigarette demand among teenagers is −1.2 to −1.4, implying that teenagers are much more responsive to price changes than adults. However, Chaloupka[24] and Wasserman *et al*[10] conclude that cigarette demand among teenagers is less responsive to price than among adults. Thus, own- and cross-tax effects of tobacco excise taxes may be quite different for other population groups.

Over the past decade, both federal and state governments have used cigarette excise tax increases to maintain or increase tax revenues, as well as to discourage cigarette use. In many states the price of smokeless tobacco products fell relative to the price of cigarettes during the 1980s, making smokeless tobacco a relatively economical alternative to cigarettes – particularly for those least able to pay higher cigarette prices (eg, young males). Indeed, moist snuff advertisements during the 1980s targeted at youth stressed that snuff use was very "economical".[1] Our results suggest that tax-induced relative price changes could be one factor among the multitude of factors affecting the growth in smokeless tobacco use among young males in the 1980s. By way of analogy, DiNardo and Lemieux[25] observe that increases in state minimum drinking age laws during the 1980s caused substitution of marijuana for alcohol use among high school seniors. In other words, individuals may respond to efforts to control the use of a particular drug by substituting an alternative drug not subject to increased control effort. The results presented here imply that an unintended consequence of further increases in cigarette tax rates could be an increased rate of smokeless tobacco use, if smokeless tobacco tax rates are not also increased.

Additional research using more complete data is needed to more precisely assess the impact of tobacco excise tax rate changes and other control efforts on the use of smokeless tobacco. Increases in smokeless tobacco excise tax rates may be an important part of a comprehensive effort to reduce the use of smokeless tobacco, and thereby reduce the incidence of disease caused by smokeless tobacco use. Of course, the optimal tax rates for each of the various types of tobacco

products depend in part upon how the products are used, the costs created by use, the responses of users to changes in prices, and the effectiveness of alternative control efforts.[26,27] However, any significant cross-price effects should be taken into account when assessing the advisability of an excise tax increase for any particular tobacco product.

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Appendix I Reduced-form estimates of state tobacco excise tax rates

	Dependent variable			
Independent variable	*Snuff tax*	*Chew tax*	*Smokeless tax*	*Cigarette tax*
Intercept	0.032	0.253	0.176	0.79
	(1.45)	(1.37)	(1.40)	(0.34)
Per capita income	−0.001	−0.001	−0.0005	0.008[c]
	(0.002)	(0.002)	(0.002)	(0.004)
High school graduates (%)	0.013[b]	0.013[b]	0.013[b]	0.002
	(0.006)	(0.006)	(0.006)	(0.014)
Unemployment rate	0.002	0.001	0.002	0.013
	(0.013)	(0.012)	(0.012)	(0.030)
Metro population (%)	0.002	0.002	0.002	0.0006
	(0.002)	(0.001)	(0.001)	(0.0004)
Fundamentalist (%)	0.003	0.003[c]	0.003	−0.001[b]
	(0.002)	(0.002)	(0.002)	(0.0005)
No religion (%)	0.003	0.003	0.003	−0.0005
	(0.002)	(0.002)	(0.002)	(0.0004)
Southern state	0.103	0.122	0.115	0.015
	(0.082)	(0.077)	(0.079)	(0.019)
Smoking laws	0.033	0.024	0.027	0.002
	(0.042)	(0.039)	(0.040)	(0.010)
Hunt/fish (%)	0.003	0.003	0.003	0.0008
	(0.004)	(0.003)	(0.003)	(0.0009)
Divorce rate	0.012	0.016	0.014	0.008[b]
	(0.013)	(0.012)	(0.013)	(0.003)
ADA ratings (av)	0.002[c]	0.002[b]	0.002[b]	0.001[b]
	(0.001)	(0.001)	(0.001)	(0.0003)
Inter-party comp index	−0.001	−0.001	−0.001	−0.0002
	(0.002)	(0.002)	(0.002)	(0.0004)
State govt tax rev per cap	−0.014	0.006	−0.001	0.013
	(0.11)	(0.107)	(0.109)	(0.026)
Age 16–17 years	−0.010	−0.001	−0.005	0.043[a]
	(0.066)	(0.062)	(0.063)	(0.025)
Age 18–24 years	0.021	0.015	0.017	−0.005
	(0.031)	(0.029)	(0.029)	(0.007)
Age 25–44 years	−0.027[c]	−0.030[b]	−0.029[c]	−0.014[a]
	(0.015)	(0.015)	(0.015)	(0.004)
Age 45–64 years	−0.021	−0.025	−0.024	0.023[a]
	(0.034)	(0.032)	(0.033)	(0.008)
% Black	−0.003	−0.003	−0.003	−0.0003
	(0.004)	(0.004)	(0.004)	(0.001)
Adjusted R^2	0.29	0.37	0.34	0.055
Dep var mean	0.073	0.076	0.075	0.159

[a] $p < 0.01$; [b] $p < 0.05$; [c] $p < 0.10$.

Appendix II Description and sample means of model variables

Variable	*Mean*
Snuff tax rate (% wholesale price)	0.08
Chew tax rate (% wholesale price)	0.08
Smokeless tax rate (% wholesale price)	0.09
Cigarette tax rate (per pack, 1985 dollars)	0.16
Per capita personal income (100s, 1985 dollars)	139.30
High school graduates (% population ⩾ 25 years)	73.13
population ⩾ 25 years)	
Metropolitan population (%)	63.39
Fundamentalist population (%)	13.17
No religion (%)	48.49
Southern state	0.22
Strict laws restricting smoking	0.48
Hunters/fisherman (% population ⩾ 16 years)	32.02
Divorce rate (per 1000 population)	5.29
Average ADA ratings US representatives†	41.34
Interparty political competition index‡	33.09
State government tax revenue *per capita* (1977 dollars)	0.55
Males 16–17 years (% of males ⩾ 16)	4.27
Males 18–24 years (% of males ⩾ 16)	16.52
Males 24–44 years (% of males ⩾ 16)	42.18
Males 44–64 years (% of males ⩾ 16)	23.91
Black males (%)	7.52
Prevalence snuff use (%)	1.90
Prevalence chew use (%)	3.90
Prevalence smokeless use (%)	5.50

† Americans for Democratic Action (ADA) ratings, based on the percentage of a representative's votes in agreement with the ADA's position, is often used as a measure of political liberalism.

‡ The interparty political competition index indicates the degree to which state govenment is dominated by a particular political party (Democratic or Republican). It ranges from 0 (complete dominance by one party) to 50 (equal party strength).

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Tobacco acquisition and cigarette brand selection among youth

Joseph R DiFranza, Jennifer J Eddy, Linda F Brown, Jennifer L Ryan, Ann Bogojavlensky

Abstract

Objective **– To study the acquisition of tobacco and the development of cigarette brand selection among youth. To compare four methods of measuring brand preference among underage smokers.**

Design **– Individual interviews were conducted with youths to elicit their past and present experiences with tobacco.**

Setting **– A high school and public places in Massachusetts, USA.**

Subjects **– A convenience sample of 721 youths, aged 10–17 years.**

Results **– Friends were the source of the subject's first cigarette in 69% of cases. Fifty per cent of the subjects were smoking three or fewer cigarettes per day when they first purchased tobacco. The first brand smoked was the first regular brand chosen in 67% of cases, and 51% of smokers were still smoking the same brand as their first cigarette. Ultra-low tar and generic brands were unpopular among youths. Questions concerning the favourite brand, brand usually purchased, last brand smoked, and friend's favourite brand produced very similar brand preference results for full-priced brands. However, only the question concerning the last brand smoked seemed to assess the use of generic brands accurately.**

Conclusions **– Brand loyalty is usually established with the first cigarette. There is a clear economic advantage to a tobacco company if the first brand smoked by a child is one of its brands. Children related making their brand selection to the influences of print advertising, free sampling, promotional items, package design, and the implied health benefits of reduced-tar brands.**

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While friends and siblings are the major sources of the first cigarettes smoked,[1] tobacco merchants ultimately become the primary sources for young smokers.[1,2] Where active law enforcement has reduced the illegal sale of tobacco to minors, dramatic reductions in the prevalence of smoking have been seen among young adolescents.[3,4] Efforts to reduce minors' access to tobacco have raised a number of questions. Where does the purchase of tobacco fit in the process of becoming a regular smoker? What prompts children to first attempt to purchase tobacco and what strategies do they use? What role do parents and cigarette vending machines play in making cigarettes accessible? Is there an underage "black market" for cigarettes? Is shoplifting common? A detailed understanding of when and how children obtain tobacco may facilitate efforts to reduce their access to tobacco.

Unpublished tobacco industry research has suggested that brand preference is often established with a child's first cigarette.[5] If this is true, the tobacco company most successful at reaching the youngest children has an obvious advantage in the battle over market share. The RJ Reynolds Tobacco Company has demonstrated recent success in this regard. The proportion of underage smokers naming Reynolds' Camel cigarettes as their favourite brand rose from 0.5% prior to the introduction of Camel cartoon advertisements in 1988, to 32.8% by early 1991.[6] A 32.8% share of the USs' children's cigarette market segment is worth $476 million per year in sales.[6,7] RJ Reynolds has challenged the assumption that young smokers actually purchase and smoke the brands they name as their favourites.[8] They have also challenged the assumption that children have favourite brands, and the assumption that the brands smoked by children with favourite brands are representative of the brands smoked by youngsters who do not have a stated brand preference.[6,9]

Additional objectives of this investigation were to investigate the development of brand selection among youths, and to assess the comparability of four methods of assessing brand share in the children's market segment.

Methods

During individual interviews, 721 youths were asked about their previous and current experiences with tobacco. The study was conducted in two parts to accommodate the educational responsibilities of the junior authors. During the summer of 1992, 383 interviews were conducted with youths 10–17 years of age using a consumer intercept marketing survey procedure in locations frequented by youths during their school vacations. The vast majority of the interviews were conducted in shopping malls, while a few were conducted in parks and at the beach. The shopping malls were located in two lower

socio-economic status urban areas where Puerto Ricans are the predominant ethnic minority group. More than 90% of the youths who were approached agreed to participate.

During the autumn of 1993, an additional 338 interviews were conducted with 9th and 10th grade students at a local high school which had large Puerto Rican and Southeast Asian populations. All of the students who had parental permission agreed to participate. As a result of active law enforcement, the community in which this high school is located has a high level of merchant compliance with the prohibition on tobacco sales to minors.

All interviews were conducted in Massachusetts, USA, where it is illegal to sell or provide tobacco to minors under 18 years of age, but where it is not illegal for minors to purchase, possess, or use tobacco.

Our sampling strategy produced a population with a bell-shaped age distribution with a range from 10 to 17 years and a mean of 14.5 years. Females made up 48.0% of the study population.

A letter explaining the study was sent to the parents of the high school students and they were asked to return the letter if they did not want their child to participate. Only one parent did so. For logistical reasons, it was not possible to obtain parental consent for the consumer intercept portion of the study. All subjects were asked to participate voluntarily in an anonymous survey concerning tobacco. If they agreed to participate they were interviewed individually by one of the authors (JJE, JLR, LFB). The study was approved by the Committee for the Protection of Human Subjects at the University of Massachusetts Medical Center.

The consumer intercept technique is frequently used in market research and has been used by the tobacco industry to study youth access to tobacco.[10] The interviewer, equipped with a clipboard and name tag, waits in a public place and invites passers-by to answer questions on a particular topic.

Subjects were asked a series of questions concerning demographics and past and present use of tobacco products. "Never-smokers" had never puffed on a cigarette. "Experimenters" had smoked fewer than ten cigarettes during their lifetime. Subjects were categorised as "ever-smokers" if they had smoked ten or more cigarettes in their lifetime. A "yes" answer to the question "Do you smoke now, even once in a while?" further categorised the subject as a "current smoker", while a "no" answer categorised the subject as an ex-smoker. Ever-smokers were asked the age at which they began to smoke "regularly" but this term was not defined for them. Questions concerning spitting tobacco produced numbers too small to report. The authors used 10 cigarettes as the cutoff for the definition of "experimenters", rather than the more common measure of 100, because our interest is in the earliest smoking experiences and we did not want to exclude subjects who had smoked only briefly.

Only current smokers were asked about their current sources of tobacco and brand preferences. All results are based on self-report without independent confirmation; 95% confidence intervals (CIs) were computed where appropriate.

Results

The denominators for our results change from question to question because some of our questions were applicable only to subsets of the subjects, and some subjects were unable to recall all of the details of their early experiences with tobacco.

Of 721 subjects, 373 (51.7%) had never smoked, 177 (24.5%) had only experimented, 43 (6%) were ex-smokers, and 128 (17.8%) were current smokers.

In this population, the mean age for the first puff on a cigarette was 12.0 years (range 4–17). The source of the first cigarette was reported by 345 of the 348 subjects who had puffed on a cigarette. Friends were the major source (69%), followed by stealing from parents (11%), getting them from siblings (8%), being given them by parents (3%), buying them (3%), and stealing them from other sources (2%).

Ever-smokers (n = 171) were asked if they had ever obtained cigarettes from specific sources. Friends had been a source for 99%, and siblings a source for 43%. A parent had given cigarettes to 25% of the subjects, while 38% of the subjects reported having stolen them from parents, 47% had stolen them from someone other than their parent, 23% reported stealing them from a store, and 66% had given money to someone else to buy cigarettes for them because they were unable to do so themselves.

To determine if a black market exists for cigarettes, we asked the smokers if they knew of other children selling tobacco for a profit, and 48% indicated they were aware of this happening. Several subjects indicated that peers were selling packets for one dollar each – far below their retail price.

Tobacco had been purchased by 71% of the ever-smokers (n = 171). Subjects were asked why they decided to purchase their first pack (n = 120). The most common answer (32%) was that either they were tired of asking for cigarettes or their friends were tired of them asking for cigarettes. Nineteen per cent stated that they began to purchase cigarettes to satisfy an addiction.

All four questions concerning the timing of the initial purchase of tobacco and the onset of experimental and regular smoking were answered by 112 subjects. In this subset, the mean age for the first puff on a cigarette was 11.3 years, for the first purchase of tobacco, 12.8 years, and for the onset of self-reported regular smoking, 13.0 years. Subjects who had purchased tobacco were asked how many weeks had elapsed between the first puff and first purchase (n = 121). For 6.6% of subjects the first purchase preceded the first puff, while 50% had purchased tobacco either before or within 10 weeks after the first puff. Fifty per

cent were smoking three or fewer cigarettes per day when they made their first purchase (n = 116). These analyses necessarily exclude smokers who had never purchased tobacco or never smoked regularly.

Convenience stores were the most common location of the first purchase (65%), followed by vending machines (12%) and gas (petrol) stations (11%) (n = 120). Of the 89 subjects who had purchased tobacco from a vending machine, 44% said that they had done so because they were unable to buy tobacco elsewhere.

The first brand smoked could be recalled by 285 subjects. While more than 17 brands were represented, Marlboro accounted for 47%, Newport for 25%, Camel for 5%, and Winston for 4%. Each of the remaining brands accounted for less than 2% of the responses. The first brand smoked is largely determined by the source of the first cigarette, with the smoker frequently having little choice.

There were 147 subjects who had smoked regularly at some time, and all but one had adopted a regular brand. The first regular brand was identical to the brand of the first cigarette smoked 67% of the time. While more than 17 brands were listed as the subjects' first cigarette, only eight were listed as the first regular brand smoked, and three brands – Marlboro, Newport, and Camel – accounted for 94% of the responses. Of 128 current smokers, 51% said that the brand of their first cigarette was their current favourite, and 65% said that their first regular brand was their current favourite.

Youngsters maintained brand loyalty despite experimentation with other brands. Ever-smokers (n = 170) had tried a mean of 5.6 brands (range 1–30). The Marlboro brand had been tried by 95% of subjects, Newport by 80%, Camel by 58%, and Winston by 48%.

Responses to the following four questions regarding brand choice were compared: "What brand was the last cigarette you smoked?", "Which brand do you buy most often?", "Do you have a favourite brand; if so, what is it?", and "What brand does your closest friend who smokes smoke?". The responses to all four questions were very similar (see table).

Ninety-eight subjects gave responses to each of the first three questions which concerned their own brand use, making a comparison of the responses to these questions possible. The favourite brand and the brand usually bought were identical for 90 subjects (92%) (CI = 0.85–0.96). The favourite brand was the last brand smoked for 69 subjects (70%) (CI = 0.61–0.79), and the brand usually bought was the last brand smoked for 73 subjects (74%) (CI = 0.65–0.82).

Only 20 of the 128 regular smokers (16%) had no favourite brand. Among these subjects, 85% had last smoked Marlboro, Newport, or Camel, with generic brands accounting for the remaining 15%. Although the numbers are small, the distribution was similar to that seen among youths who do have a brand preference, with the possible exception of an increased use of generics among youths with no favourite brand.

In a separate question, 128 current smokers were asked how often they smoke generic cigarettes. Only 6% responded that they smoked them "a lot", 66% smoked them occasionally, and 27% never smoked them. Several subjects indicated that they bought the cheaper generics only when they cannot afford their favourite brand.

Current smokers were asked to rate ultra-low-tar, light, and regular strength cigarettes on a five-point scale with one representing "yuck", and five representing "great". The 108 subjects who had tried ultra-low-tar gave them a mean rating of 1.6. The 124 subjects who had tried light cigarettes gave them a mean rating of 2.6. The 128 who had tried regulars rated them at 4.1.

The 107 subjects who had favourite brands were asked why they chose them. The most commonly volunteered response was "taste" (46%) followed by "I'm used to it" (21%). A variety of other answers comprised the remaining 33%. These included: "it doesn't kill you so much", "my idol smokes them", "cute cowboys" (Marlboro), "Camels are cool", "I like the colour of the package" (Marlboro), and "I like the box" (Camel). Only 4% of respondents volunteered that their friends' brands were a factor in their brand selection (n = 128). Yet 58% of the time, the subject's favourite brand was the same as that smoked by their closest smoking friend (n = 128), and 67% of the time, the brand bought most often was the same as that smoked by the closest smoking friend (n = 107).

When asked specifically, 128 current smokers identified the following factors as influencing their brand selection: taste (78%), strength (60%), availability (52%), price (34%), and what their friends smoke (32%).

Thirty per cent (n = 127) indicated that they had purchased a particular brand to obtain a free promotional item such as a tee-shirt or lighter. Two-thirds of these were responding to a promotional offer for the Camel brand.

Table A comparison of four methods for determining cigarette brand preferences among youths

	Last brand smoked	*Brand usually bought*	*Favourite brand*	*Brand of closest friend*
n	128	111	108	125
Marlboro	51%	58%	58%	56%
Newport	23%	26%	27%	23%
Camel	9%	10%	10%	11%
Generics	12%	2%	1%	2%
Other	5%	4%	4%	7%

Discussion

Since the first purchase of tobacco usually occurs prior to the onset of regular smoking, interventions which stop the illegal sale of cigarettes to minors have the potential to halt the progression from experimentation to regular smoking in these young smokers.

While vending machines accounted for a small fraction of total sales to minors, they represent the weakest link in the defence

against illegal sales, since 44% of the youths who had used vending machines had done so because they could not buy from other sources. If sales assistants were to abide by the law, vending machines could become a greater source of tobacco for youths.

Tobacco is the most commonly shoplifted product in retail stores.[11] Some communities have banned self-service displays of tobacco products on the theory that they invite shoplifting by underage smokers. Of our underage smokers, 23% admitted to stealing cigarettes from stores. Although some youths were selling cigarettes to their peers, the fact that they were selling them below retail price argues that, in our community, this represented an outlet for shoplifted cigarettes rather than a way for underage smokers to get around the minimum age law.

Parents who smoke may undermine the efficacy of tobacco access law enforcement by acting as a source of tobacco for their children, either wittingly or unwittingly. It is disappointing that the parents of 25% of our underage smokers had given cigarettes to their children. In another study, 16.9% of ninth-grade smokers indicated that they usually obtain cigarettes from parents or other adults.[1] Of the smokers in this study, 38% had stolen cigarettes from their parents. It is possible that the higher prevalence of smoking among the offspring of smokers may be due, in part, to their increased access to tobacco. It would be interesting to see if the discrepancy in smoking rates among the offspring of smoking and non-smoking parents increases as illegal sales to children are curtailed.

Brand loyalty is usually established with the first cigarette smoked. The first brand tried was the first regular brand chosen 67% of the time. Although youngsters experiment with a variety of brands, 51% of our subjects were still smoking the same brand as their first cigarette. It is therefore of clear economic advantage to a tobacco company if the first brand smoked by a child is one of their brands.

Although only 4% of our subjects volunteered that their friends influenced their brand selection, 58% smoked the same brand as their closest smoking friend. We believe that this is due primarily to the high degree of loyalty to the initial brand smoked and the fact that friends are the most common source of the initial cigarette. By targeting advertising at youths who smoke, tobacco companies can effectively influence the brands available to first-time smokers.

RJ Reynolds' criticism[8,9] of previous surveys[6] for assuming that children have favourite cigarette brands and actually purchase them, seems unfounded. Regular smokers were found to have a favourite brand 84% of the time, and to purchase their favourite brand 92% of the time. Further, the actual brand use of those who do not have a favourite brand appears to parallel that of those who do. It is therefore reasonable to assume that the pattern of brand use among subjects who have favourite brands is representative of that of the entire survey population.

All four methods of measuring brand selection produced quite similar estimates of the use of the full-priced name-brands (see table). The reported use of generic brands was much higher in response to the question "what brand was the last cigarette you smoked?" than to any of the other three questions. Our subjects resorted to smoking generic brands 12% of the time, although these are neither their favourites nor what they usually buy. Youths frequently obtain cigarettes from their friends, and when this occurs they may end up smoking a brand that is neither their favourite nor what they would usually buy. We would conclude therefore, that with the recent introduction of generic brands, asking youths "what was the brand of the last cigarette you smoked?" produces the most accurate data on what they are actually smoking. However, previous surveys which inquired about brand preference should have produced reasonably accurate estimates of the use of full-priced brands.

In the US at the time of this study, the price of generic or "value-priced brands" was as low as one-half the price of the full-priced name-brands. In our population, generic brands accounted for only 12% of the cigarettes smoked by children at a time when they accounted for 28%–35% of all cigarette sales in the US.[12,13] Our interviews made it clear that the vast majority of young smokers will smoke generic brands only as a last resort, explaining why generics barely register on brand preference surveys. This suggests that either youngsters are more concerned with the taste of their cigarettes than are adult smokers, or that, despite more limited finances, few youngsters are willing to sacrifice brand image for economy.

Concern has been raised over the possibility that very low tar cigarettes facilitate the uptake of smoking by youths by making it easier to smoke without feeling ill. We did not find evidence of this in that our subjects expressed a great distaste for very low tar cigarettes. By far, regular full-strength brands were preferred.

It would be illogical to conclude from our findings that children smoke primarily the Marlboro, Newport and Camel brands because other children smoke these brands. How would one explain why children smoke these three brands and not three, or 30, others? Why do 69% of teenage smokers smoke Marlboro, when the overall market share for Marlboro is only 26%?[14] If peers are the primary influence on brand selection how would one explain the rapid 50- to 60-fold increase in the popularity of Camel cigarettes among underage smokers in the US?[6,14,15]

The tobacco industry describes children's brand selection as guided by the "herd instinct".[5] We agree that when it comes to cigarette brand preference children do behave like a herd, but the movement of the herd is guided primarily by the tobacco industry's marketing efforts.[6,14,15] The present study adds to the already convincing evidence in this regard in that our subjects related making their

brand selection based upon the influences of print advertising, free sampling, promotional items, package colour, package design, and the implied health benefits of low-tar brands.

Due to the unique ethnic and racial mix of our population, and recent efforts to prevent the sale of tobacco to minors in this community, caution should be used in generalising some of our findings to larger populations. In particular, no inferences can be made about the national pre-adult market share of particular brands based upon these data.

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The cover story in the 20 February 1994 issue of the Washington Post Magazine *focused on smoking by youth, and the role of advertising. Illustrations by Tim Gabor.*

From the US Food and Drug Administration

The control and manipulation of nicotine in cigarettes

David A Kessler

On 25 March 1994 the Commissioner of the US Food and Drug Administration (FDA), Dr David Kessler, presented testimony to the Subcommittee on Health and the Environment, US House of Representatives, on the addictive nature of cigarette smoking and possible tobacco industry manipulation of nicotine levels in cigarettes. That testimony was reproduced in the Summer 1994 issue of Tobacco Control *(1994; 3:148–58).*

On 21 June 1994 Dr Kessler reappeared before the same subcommittee, and presented testimony on genetic and chemical manipulation of nicotine content. This statement is reproduced below. Twenty-two charts, which for the most part duplicated material in the text, have been omitted. Also, some of the references have been modified to conform to the journal's style. Otherwise, the testimony is reproduced in its original form. – ED

In my last appearance before this subcommittee on 25 March 1994, I raised the question of whether the FDA should regulate nicotine-containing cigarettes as drugs under the Federal Food, Drug, and Cosmetic Act.[1] A product is a drug if its manufacturer intends it to be used to affect the structure or function of the body.[2] Because of the enormous social consequences of such a decision, we have asked Congress for guidance as we try to answer this question.

Mr Chairman, the American public owes a huge debt of gratitude to this subcommittee for its tireless efforts to focus attention on this most important public health matter.

Let me begin by summarising the information that I presented at that hearing. I reviewed the evidence that supports the scientific consensus that nicotine is addictive. I also reviewed the evidence we had at that time on the ability of the tobacco industry to control nicotine levels, including numerous industry patents for technologies to manipulate and control nicotine content. I described activities of the cigarette industry that resemble those of pharmaceutical manufacturers. I presented information that raised the question of whether tobaccos were blended to manipulate and control nicotine levels. And I provided data showing that over the last decade, nicotine levels have not dropped in parallel with tar levels – in fact, they have risen.

Since March 25th we have continued to focus our analysis and investigation on the physiological and pharmacological effects of nicotine and on the degree to which cigarette companies manipulate and control the level of nicotine in their products.

The information that I presented about industry control and manipulation of nicotine the last time I testified before you was suggestive. Today I am going to provide you with actual instances of control and manipulation of nicotine by some in the tobacco industry that have been uncovered through painstaking investigational work over the last three months.

We have discovered that manipulation of nicotine has been carried out by some even before tobacco seeds were planted in the fields. We have discovered other forms of manipulation that occur later, in the design and manufacture of cigarettes.

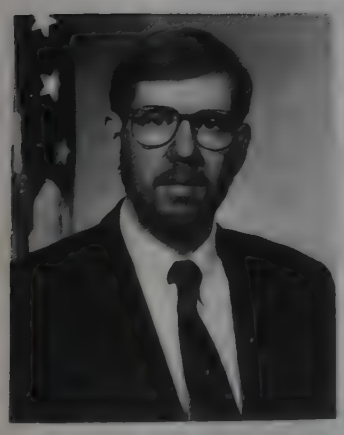
Today I want to discuss two examples of nicotine manipulation in some detail. First, we have discovered the deliberate *genetic* manipulation of the nicotine content in a tobacco plant. It is the story of how an American tobacco company spent more than a decade quietly developing a high-nicotine tobacco plant, growing it in Central and South America, and using it in American cigarettes. Second, I will discuss how chemical compounds are added to cigarettes to manipulate nicotine delivery.

Genetic manipulation of nicotine content

The project I am going to tell you about led to development of a tobacco plant code-named "Y-1". It has been an enormous task to piece together the picture of Y-1. Confidentiality agreements have made getting the facts very difficult.

The story begins in Portuguese with our discovery of a Brazilian patent for a new variety of a flue-cured tobacco plant (figure 1).[3] One sentence of its English translation caught our eye. "The nicotine content of the leaf of this variety is usually higher than approximately 6% by weight ... which is significantly higher than any normal variety of tobacco grown commercially."[4]

Prior to our discovery of the patent, an industry executive had told us that "flue-cured tobacco naturally contains 2.5 to 3,5 percent nicotine."[5] Thus, this new specially bred plant would contain approximately twice the nicotine that occurs naturally in flue-cured tobacco.



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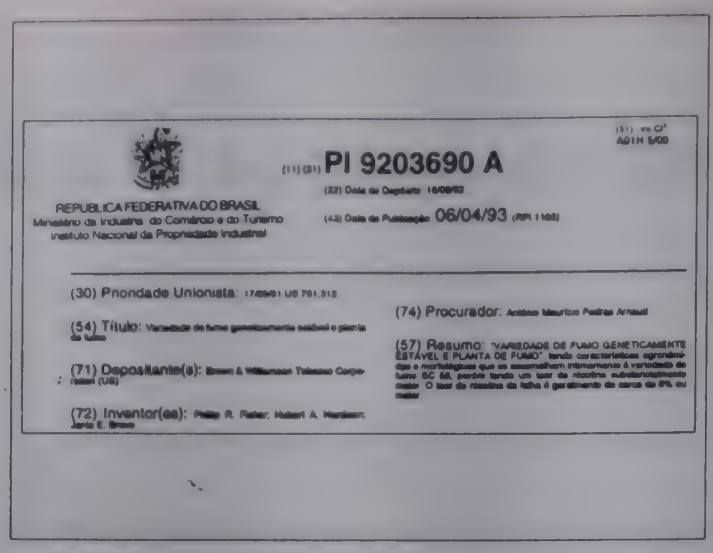

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(71) Depositante(s):

(72) Inventor(es):

Figure 1

The holder of the Brazilian Y-1 patent was Brown & Williamson Tobacco Corporation, maker of such cigarettes as Kool, Viceroy, Richland, Barclay, and Raleigh.

Let me tell you why this discovery interested us. Industry representatives have repeatedly stated for the public record that they do not manipulate nicotine levels in cigarettes. The plant described in this patent represents a dramatic attempt to manipulate nicotine.

Moreover, when we asked company officials whether plants were bred specifically for higher nicotine content, we were told that this was not feasible. We were told that tobacco growers and cigarette manufacturers have an agreement that the nicotine level of new varieties of tobacco grown in the US can vary only slightly from the levels of standard varieties. Under this agreement, a new high-nicotine tobacco plant that varied more than slightly from the standard variety could not be commercially grown by farmers in the US.

Nevertheless, we learned that interest in developing a high-nicotine tobacco plant dates back to at least the mid-1970s. In 1977, Dr James F Chaplin, then of both the US Department of Agriculture (USDA) and North Carolina State University, stated:

"manufacturers have means of reducing tars but most of the methods reduce nicotine and other constituents at the same time. Therefore it may be desirable to develop levels constant or to develop lines higher in nicotine so that when the tar and nicotine are reduced there will still be enough nicotine left to satisfy the smoker."[6]

In fact, Dr Chaplin had been working on genetically breeding tobacco plants with varying nicotine levels. In a 1977 paper, Dr Chaplin indicated that tobacco could be bred to increase nicotine levels, specifically by cross breeding commercial varieties of tobacco with *Nicotiana rustica*. *N rustica* is a wild variety, very high in nicotine, but not used commercially in cigarettes because it is considered too harsh.[7]

Dr Chaplin has told us that his specially bred plants were not commercially viable because they did not grow well and literally did not stand up in the field. Furthermore, he was surprised that he could not get the nicotine levels as high as he anticipated. In fact, in his 1977 paper, the highest nicotine level he reported in these specially bred lines was 3.4% total nicotine, within the normal range for flue-cured tobacco.

At the same time, international efforts focused on controlling and manipulating nicotine by alternative methods. For example, the use of reconstituted tobacco:

"... [LTR, a maker of reconstituted tobacco] which homogenises tobacco for various European cigarette houses cannot only reduce the tar in the sheet it sends back to clients; it is able to work into client's scrap and waste new tobacco of the *rustica* type, rich in nicotine, in order to change the relationship of nicotine and tar in the sheet. It is able to do the same by the alternative method of adding salts of pure nicotine into the slurry that eventually becomes tobacco sheet. This is an operation parallel to, though more exact than, that on which US geneticists are engaged, in seeking to develop types of tobacco that are low in tar but fairly rich in nicotine."[8]

Over the next several years Dr Chaplin continued his efforts to breed a tobacco plant with a higher nicotine level. During that time, an employee of a Brown & Williamson-affiliated company asked Dr Chaplin for some of his seeds. Some of Dr Chaplin's original plant varieties were used as a basis for Brown & Williamson's work. From what we can gather, there was no formal release of this high-nicotine tobacco variety for private use. In the early 1980s, Brown & Williamson grew a number of different plant lines on its experimental farm in Wilson, North Carolina, selecting those that had the best agronomic characteristics.

In 1983, Brown & Williamson contracted with DNA Plant Technology to work on tobacco breeding. Much of the developmental work on Y-1 took place in the laboratories, greenhouses, and fields owned by DNA Plant Technology. After he retired from USDA, in 1986, Brown & Williamson also hired Dr Chaplin as a consultant to work on Y-1 and other projects.

The high-nicotine tobacco variety Y-1 was developed by a combination of conventional and advanced genetic breeding techniques (figure 2). These include traditional crosses and back crosses between different plant varieties and more sophisticated state-of-the-art breeding techniques including anther culture (figure 3), tissue culture (figure 4), hybrid sorting, and protoplast fusion (figure 5) that resulted in cytoplasmic male sterility. The

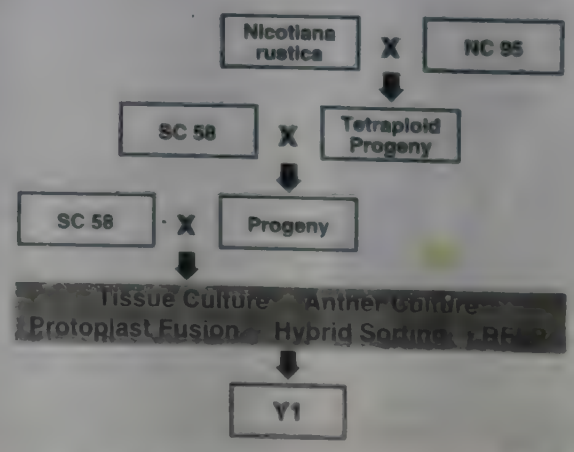


Figure 2 The breeding of Y-1. Sources: Brazilian Patent PI 9203690A and DNA Plant Technology Corporation

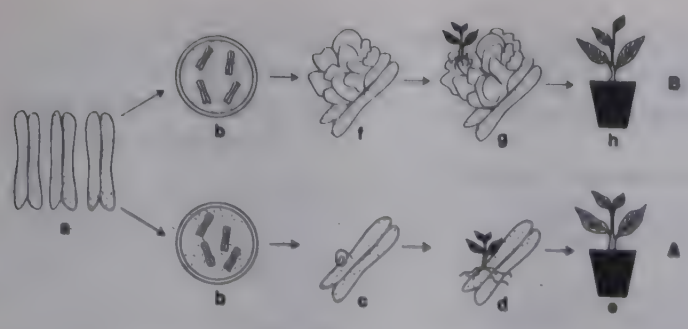


Figure 3 Anther culture. Source: Breeding field crops *3rd edn, J M Poehlman*

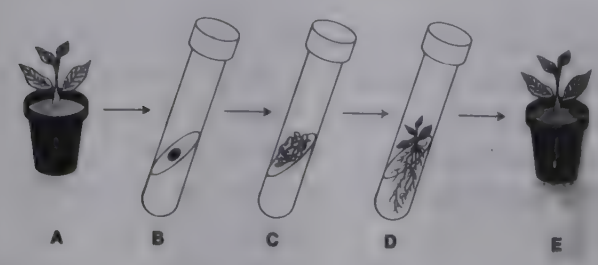


Figure 4 Tissue culture. Source: (as figure 3)

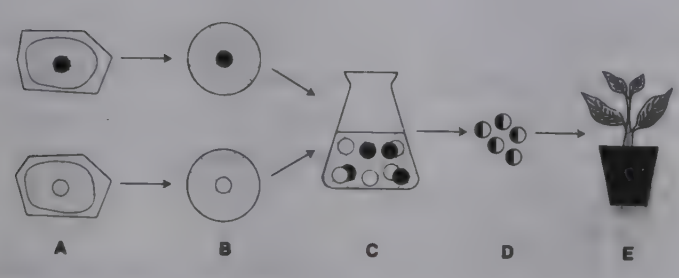


Figure 5 Protoplast fusion. Source: (as figure 3)

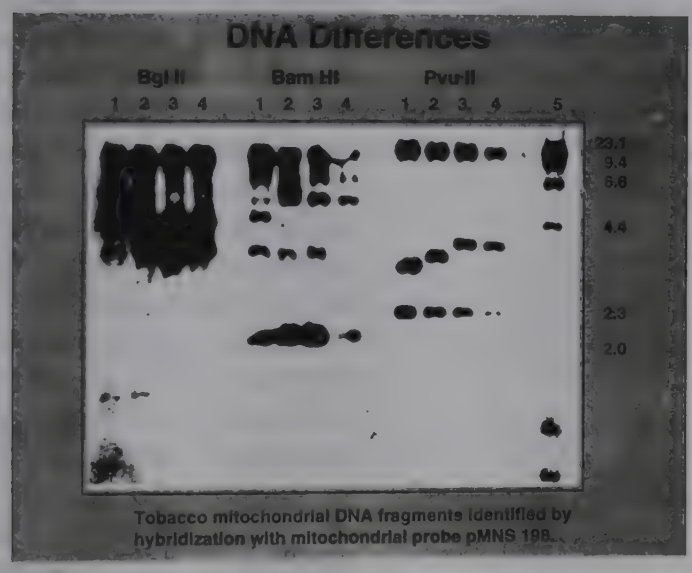


Figure 6 Y-1 restriction fragment length polymorphism. Tobacco mitochondrial DNA fragments identified by hybridization with mitochondrial probe pMNS 198. Source: US Patent application no 761,312

genetic makeup of Y-1 was verified by using genetic engineering techniques involving Restriction Fragment Length Polymorphism (RFLP) (figure 6).[9] The value of Y-1 to Brown & Williamson is reflected in the fact that Brown & Williamson had DNA Plant Technology make Y-1 into a male sterile plant. This procedure ensures that when a plant is grown it will not produce seeds that can be appropriated by others.

Brown & Williamson characterised its achievement in a patent filing as follows:

"By the present invention or discovery, applicants have succeeded in developing a tobacco plant that is agronomically and morphologically suitable for commercial tobacco production, ie, it closely

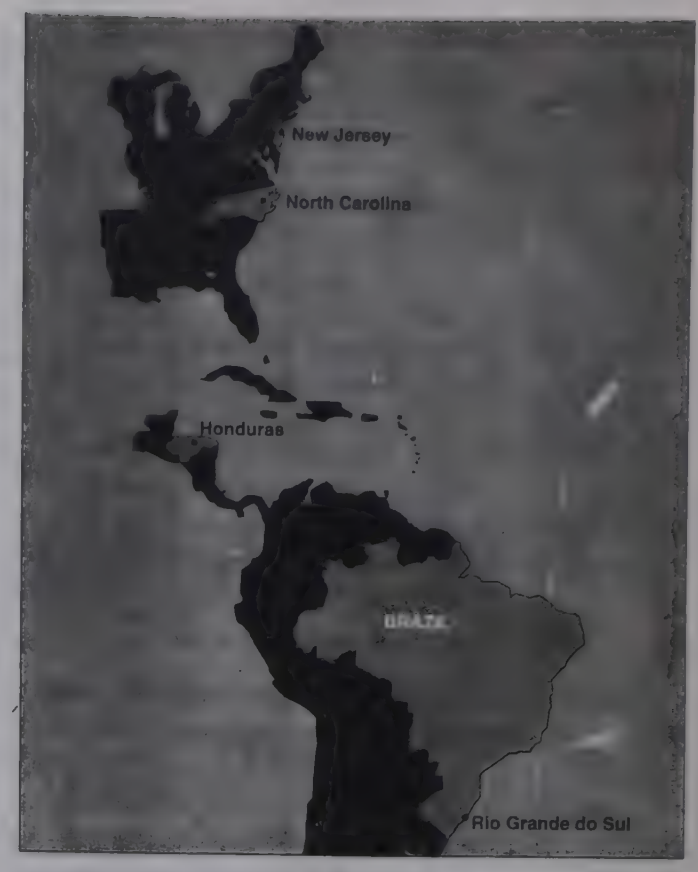


Figure 7 Where Y-1 was developed and grown

resembles SC 58, and provides a pleasant taste and aroma when included in smoking tobacco products, *yet it is possessed of the N rustica high-nicotine attribute.* So far as we know, this has not been accomplished before ..."[10] [emphasis in original]

What was accomplished was the development of a tobacco plant with a high nicotine content – about 6 % – that grew well and could be used commercially.

The story of this high-nicotine plant continues in Rio Grande do Sul, Brazil (figure 7). DNA Plant Technology and Dr Chaplin both told us they saw Y-1 growing in Brazil in the 1980s. These farms were under contract to Souza Cruz Overseas, a sister company of Brown & Williamson.

We do not yet have all the details of how Y-1 came to be growing in Brazil. Until 13 December 1991, export of tobacco seeds or live tobacco plants was prohibited under Federal law unless a Tobacco Seed Plant Export Permit (Form TB-37) was granted by the USDA.[11] Such a permit could be granted only after satisfactory proof was offered that the seeds or plants were to be used solely for experimental purposes and then only in amounts of a half a gram or less.[12]

Brown & Williamson and DNA Plant Technology have each informed FDA that they believe the other may have been responsible for the shipment of Y-1 seed outside the US. We have asked both companies to furnish copies of any Tobacco Seed Plant Export Permits for Y-1.[13]

In reading the Brazilian Y-1 patent, we discovered that two related applications for the Y-1 variety of a tobacco plant were filed in the United States. Brown & Williamson filed a US patent application and a Plant Variety Protection Certificate Application in 1991.[14,15] The company also deposited samples of seeds from this plant with the National Seed Storage Laboratory in Fort Collins, Colorado.

When we attempted to obtain the Plant Variety Protection Certificate Application

- **Feb 21, 1991:** Brown & Williamson (B&W) files application for Plant Variety Protection Certificate
- **Sept 17, 1991:** B & W files U.S. Patent Application # 761, 312
- **Sept 16, 1992:** B & W files Brazilian Patent P1 9203690A
- **Feb 28, 1994:** B & W appeals rejection of U.S. Patent Application # 761, 312
- **March 14, 1994:** B & W withdraws application for Plant Variety Protection Certificate
- **March 16, 1994:** B & W abandons U.S. Patent Application # 761, 312

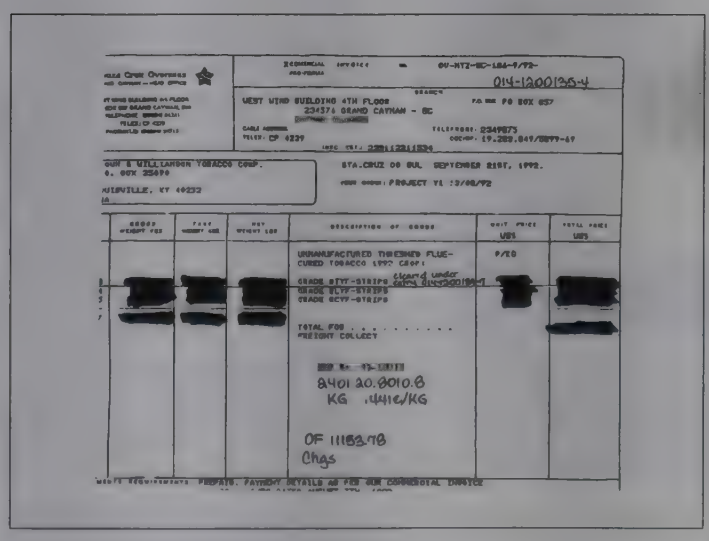
Figure 8 Chronology of significant events

from the USDA, we learned that the application was withdrawn about three months ago, on 14 March 1994. We were told that Brown & Williamson also withdrew all seed samples for this variety from the Seed Storage Laboratory.

We learned that the US patent application had been rejected by the patent examiner,[16] but that Brown & Williamson had filed an appeal on 28 February 1994.[17] However, two weeks later, on 16 March 1994, before receiving a response to their appeal, Brown & Williamson expressly abandoned the patent (figure 8).[18]

On Friday, 10 June 1994, DNA Plant Technology told us that it had been authorized by Brown & Williamson to tell FDA that Y-1 was never commercialised.

Mr Chairman, I wish to submit for the record two invoices filed with the US Customs Service in 1992 (figure 9). The invoices are addressed to Brown & Williamson Tobacco Corporation, Louisville, Kentucky from Souza Cruz Overseas. They refer to "Your Order Project Y-1" and reveal that more than half a million pounds of Y-1 tobacco were shipped to Brown & Williamson on 21 September 1992.[19]



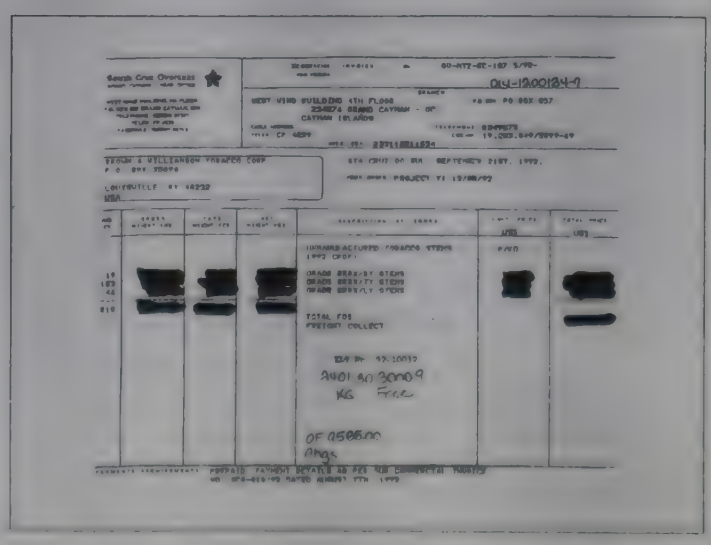


Figure 9 Invoices filed with US Customs Services in 1992

Four days ago, on Friday 17 June, after our questioning of DNA Plant Technology, and following our letter to Brown & Williamson indicating that Brown and Williamson had not been cooperative with our investigation, Brown & Williamson told FDA that, in fact, three and a half to four million pounds of Y-1 tobacco are currently being stored in company warehouses in the United States. More significantly, Brown & Williamson revealed that Y-1 had, in fact, been commercialised.

Mr Chairman, these brands of cigarettes – Viceroy King Size, Viceroy Lights King Size, Richland King Size, Richland Lights King Size, and Raleigh Lights King Size – were manufactured and distributed nationally in 1993 with a tobacco blend that contains approximately 10% of this genetically bred high-nicotine tobacco called Y-1.*

When we asked company officials why they were originally interested in developing a high-nicotine variety of tobacco, they told FDA that they wanted to be able to reduce tar, while maintaining nicotine levels.

The chemical manipulation of nicotine

Let me now move on to the second area. In April, the six major American cigarette companies released a list of 599 ingredients added to tobacco. Nicotine is not one of the additives listed. But, Mr Chairman, a number of chemicals on that list increase the amount of nicotine that is delivered to the smoker.

Around the time the list was made public, a great deal of interest was directed toward substances on the list that sounded particularly toxic. Among those frequently mentioned was ammonia. Many people may have wondered why the cigarette industry would add ammonia to tobacco. In fact, there are many uses of ammonia.[20] Our investigations have revealed an important one.

Let me refer to a major American tobacco company's 1991 handbook on leaf blending and product development. The handbook describes two ways that ammonia can be used in cigarette manufacture. One way is to interact with sugars in the tobacco. But it is the second way, the effect of ammonia and related compounds on the delivery of nicotine to the smoker, that is most striking. Let me quote from that handbook:

"[The ammonia in the cigarette smoke] can liberate free nicotine from the blend, which is associated with increases in impact and 'satisfaction' reported by smokers."

The handbook goes on to describe ammonia as an "impact booster":

"Ammonia, when added to a tobacco blend, reacts with the indigenous nicotine salts and liberates free nicotine. As a result of such change, the ratio of extractable nicotine to bound nicotine in the smoke

* See photograph published in the Autumn 1994 issue of *Tobacco Control* (1994; 3: 203). – ED

may be altered in favor of extractable nicotine. As we know, extractable nicotine contributes to impact in cigarette smoke and this is how ammonia can act as an impact booster."

The important role that ammonia plays in the liberation of free nicotine is also emphasized in other parts of the handbook.

"This means that at the same blend alkaloid content, a cigarette incorporating [ammonia technology] will deliver more flavor compounds, including nicotine into smoke than one without it."

It is important to emphasize here that most of the nicotine in the average American cigarette is in the bound form. By that I mean it is not going to readily make its way to the smoker. Mr Chairman, I am not going to go into the details of acid-base, and vapor-phase chemistry, or the bioavailability of nicotine in the protonated versus the unprotonated form. Suffice it to say that only a fraction of the nicotine in the tobacco gets inhaled by the smoker. The handbook indicates that this ammonia technology enables more nicotine to be delivered to the smoker than if the ammonia technology is not employed.

What are the ammonia compounds used in this technology? The company handbook lists a number of different chemical compounds that can act as "impact boosters". Ammonia compounds known to be used include diammonium phosphate (DAP), ammonium hydroxide, and urea. In those countries, such as Germany, that do not allow DAP, other proprietary formulations are used.

To what are these compounds added? One of the most common places the ammonia and ammonia-like compounds are applied is to reconstituted tobacco.[21] When the cigarette is burned, the reconstituted tobacco serves as a source of ammonia in smoke. The amount of reconstituted tobacco can be as high as 25% of the tobacco in the cigarette. And we've seen ammonia compound levels as high as 10% in the reconstituted tobacco. Thus, as the company handbook goes on to state, the benefits of the reconstituted tobacco:

"come from being an ammonia source, as well as incorporating sugar-ammonia reactions. As a low alkaloid blend component, it also absorbs nicotine from higher alkaloid-containing components. [It thus becomes] ... a positive blend contributor rather than merely a filler."

The handbook also says that ammonia can be applied directly to the tobacco that goes into cigarettes.

How much additional nicotine does this technology impart? It is our understanding, based on smoke analysis described in the company handbook, that an experimental cigarette made of reconstituted tobacco treated with ammonia has almost double the nicotine transfer efficiency of tobacco.

How widespread is ammonia use in the industry? The company handbook states that many US tobacco companies use ammonia technologies. Until we have access to similar documents from other companies, we will not know whether other companies use it directly to affect nicotine levels.

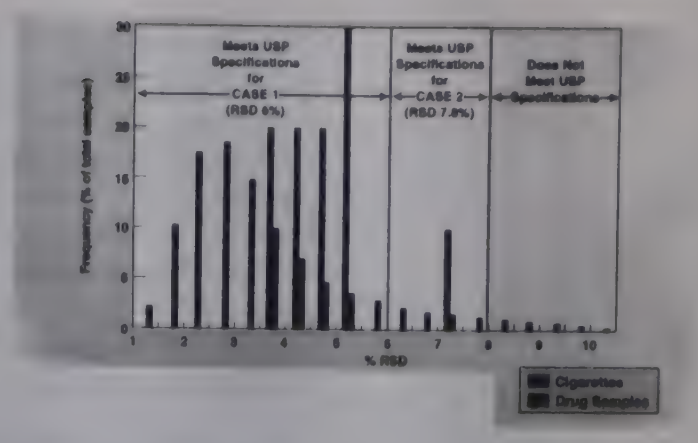

Meets USP Specifications for CASE 1 (RSD 6%)
Meets USP Specifications for CASE 2 (RSD 7.8%)
Does Not Meet USP Specifications
% RSD
Cigarettes
Drug Samples

Figure 10 Comparison of the uniformity of drug samples and nicotine in 10 brands of cigarettes (11639 drug samples). RSD = relative standard deviation, being a measurement of content uniformity.

To determine how well nicotine content is controlled in cigarettes, FDA laboratories compared the content uniformity of drugs in either tablets or capsules to the content uniformity of nicotine in cigarettes. What is striking is how little the nicotine content varies from cigarette to cigarette, suggesting tight and precise control of the amount of nicotine in cigarettes.[22] In fact, as figure 10 shows, the nicotine content uniformity of the cigarettes tested meets drug content uniformity standards set by the US Pharmacopeia.

Mr Chairman, I have presented information on the control and manipulation of nicotine because I believe it raises certain important questions – questions that are even more important in light of the repeated assertions of the cigarette industry that it does not control or manipulate nicotine. Why spend a decade developing through genetic breeding a high-nicotine tobacco and adding that tobacco to cigarettes if you are not interested in controlling and manipulating nicotine? Why focus on the enhanced delivery of free nicotine to the smoker by chemical manipulation if you are not interested in controlling and manipulating nicotine?

The goals of control and manipulation

Why is there such interest in controlling and manipulating nicotine in cigarettes? Senior industry officials are aware that nicotine is the critical ingredient in cigarettes. Some in the industry have identified target levels of nicotine necessary to satisfy smokers' desire for nicotine. And the industry has undertaken research into nicotine's physiologic and pharmacologic effects.

TARGET RANGES

Let me give you one example of how a company has identified specific levels of nicotine necessary to satisfy smokers and has focused on how to achieve those levels. A company document describesconsumerpreferencetestingon"impact", which according to the company correlates with nicotine. The document states that impact is a "high priority" attribute of cigarettes and is:

"... controllable to relatively fine tolerances by product development/product intervention ... (by manipulating nicotine in blend/smoke ...)."

This document goes on to describe an elaborate model for establishing the minimum and maximum nicotine levels tolerated by consumers. It states that the model provides "a median ideal point level for mg nicotine in smoke" for the population tested and a range of tolerable nicotine levels around this ideal point. After applying the testing method to a group of European smokers, for example, the document concludes:

"It is clear that consumers are less tolerant of decreases than they are of increases in nicotine delivery. By the time nicotine level falls to approximately 0.35 mg, 50% of consumers will be saying that the level of impact is so low they would reject the product. To reach the equivalent stage of 50% of consumers rejecting the product as having too high an impact level, a nicotine level of approximately 5.0 mg would be required. Again, it is important to note that there is a clear *upper* as well as lower rejection limit for nicotine in smoke."

It is thus clear that at least one major cigarette manufacturer is aware of the need to target nicotine delivery to levels necessary to satisfy smokers. In fact, as one tobacco flavour specialist has written, one of the most important goals of cigarette design is to "ensure high satisfaction from an adequate level of nicotine per puff", and that even cigarettes with reduced levels of nicotine and tar must have this property.[23]

Physiologic and pharmacologic effects of nicotine

Publicly available information, including recently released documents, reveals much about the industry's knowledge of the drug-like effects of nicotine.

I will begin by describing several studies commissioned by the tobacco industry. As I go through them, Mr Chairman and members of the Subcommittee, ask yourselves: Are these the kinds of studies that would be conducted by an industry interested only in the flavour or taste of nicotine?

On 16 May 1994, Brown & Williamson made available previously unreleased results of research that had been conducted more than 30 years ago. A review of this research, known as the Project Hippo studies, documents that the industry was interested in the physiologic and pharmacologic effects of nicotine as early as 1961.

The first report, known as Project Hippo I, contained an extensive discussion of the effects of nicotine in the body.[24] This included, for example, the effects of nicotine on the central nervous system.

Project Hippo II is an interesting study of what was, in the early 1960s, the newly evolving field of tranquilizers.[25] Let me quote from the opening paragraph of the summary of the Final Report on Project Hippo II:

"The aim of the whole research "HIPPO" was to understand some of the activities of nicotine – those activities that could explain why cigarette smokers are so fond of their habit. It was also our purpose to compare these effects with those of the new drugs

Figure 11 Tobacco advertisement from the 1940s.

called "tranquilizers", which might supersede tobacco habits in the near future."

The comparison of the drug-like effects of nicotine and tranquilizers was not exactly a well-kept secret. Even in the 1940s you could pick up a magazine and see an advertisement like the one shown in figure 11. What seems to be new about the Hippo study was that it represented a serious commitment by a tobacco company to a scientific examination of this pharmacologic property.

Another report released with Hippo and conducted in the 1960s is called "*The fate of nicotine in the body*".[26] It reviews the state of knowledge about the distribution of nicotine in the body and presents the results of studies on nicotine metabolism in a group of smokers. The report states:

"The numerous effects of nicotine in the body may, at first, be conveniently measured by various physiological and pharmacological experiments."

The studies involved the use of radiolabelled nicotine in both humans and animals, which provided very sophisticated knowledge of the absorption and distribution of nicotine in the body. This included a knowledge of how much nicotine is present in the blood of smokers; how this nicotine is distributed; how it is excreted; and what variables affect the duration of a nicotine blood level.

It is clear that such research would be of interest to the industry only if the industry were concerned with the physiological and pharmacological effects of nicotine. Certainly, this is not consistent with the industry's representation that nicotine is of interest to it only because of flavour and taste.

Mr Chairman, we believe that the studies released by Brown & Williamson are relevant to the determination of whether nicotine-containing cigarettes are drugs for purposes of the Federal Food, Drug, and Cosmetic Act. And Brown & Williamson is not the only company that apparently has been involved in research on nicotine's physiologic and pharma-

cologic effects. Thanks to this Subcommittee's work, we now know that Philip Morris was conducting nicotine addiction research. We are also aware of research utilising electroencephalographic measurements to monitor the biological effects of nicotine on brain function at both RJ Reynolds[27–30] and Philip Morris.[31]

Major projects undertaken by at least two companies to develop cigarette alternatives also demonstrate that the industry understands that nicotine is the critical ingredient they are delivering to smokers.

It is widely known that in the late 1980s RJ Reynolds Corporation developed and test-marketed a cigarette alternative called Premier. It was smokeless and virtually tobacco free. It was essentially a nicotine delivery system. To make sure that Premier would be an acceptable alternative to smokers, RJ Reynolds conducted human studies to determine whether the nicotine from Premier and from a standard cigarette was absorbed into the blood of research subjects, metabolised, and excreted at the same rate.[32]

Recent reports in the media reveal that Brown & Williamson, too, launched an effort to develop a cigarette alternative. It was referred to as "Ariel". Brown & Williamson's own documents reportedly refer to Ariel as "a nicotine delivery device". One of the applicants for the patent for Ariel was Charles Ellis of British American Tobacco (BAT), Brown & Williamson's corporate parent. Ariel was composed of two parts: a source of nicotine and aerosol, and a heating material such as tobacco that served to heat the nicotine and cause the release of the nicotine and the aerosol.[33]

Mr Chairman, we further believe that recent reports in the media also may be relevant to the determination of whether nicotine-containing cigarettes are drugs.

Let me quote some of the recently reported statements of officials from one company that reveal a recognition of nicotine's drug-like effects:

"Nicotine is not only a very fine drug, but the techniques of administration by smoking has (sic) considerable psychological advantages."[34]

"... nicotine is a very remarkable, beneficent drug that both helps the body to resist external stress and also can, as a result, show a pronounced tranquilizing effect."[35]

These statements were apparently made by Sir Charles Ellis, a member of the Royal Society of London, who served as science advisor to the BAT Company board. He was responsible for advising the establishment of the company's research and development centre in Southampton, England. He was also responsible for advising on the research operations of BAT's associate companies.[36] Two of his recently reported statements are particularly striking. One statement was made in 1962:

"Smoking is a habit of addiction."[35]

But perhaps the most striking statement attributed to him is one from a meeting of company scientists in 1967:

"Sir Charles Ellis states that BATCO is in the nicotine rather than the tobacco industry."[37]

These statements are echoed by those made in an internal company document by another senior scientist at a British tobacco company:

"There is now no doubt that nicotine plays a large part in the action of smoking for many smokers. It may be useful, therefore, to look at the tobacco industry as if for a large part its business is the administration of nicotine (in the clinical sense)."

These statements are consistent with the quotes from William L Dunn, an official of Philip Morris, that I cited for you in my testimony last March.

"Think of the cigarette pack as a storage container for a day's supply of nicotine."
"Think of the cigarette as a dispenser for a dose unit of nicotine."
"Think of a puff of smoke as the vehicle for nicotine."
"Smoke is beyond question the most optimized vehicle of nicotine..."

Other scientists are quoted in a 30 May 1963 paper that is reported to have been produced for Brown & Williamson's sister company, the BAT Company, and labelled "*Confidential. A tentative hypothesis on nicotine addiction.*"[38] As reported, it contains a number of statements regarding the powerful effect of nicotine on the body:

"Chronic intake of nicotine tends to restore the normal physiological functioning of the endocrine system, so that ever-increasing dose levels of nicotine are necessary to maintain the desired action. Unlike other dopings, such as morphine, the demand for increasing dose levels is relatively slow for nicotine."

Other statements reportedly made in this paper speak directly to the addictive nature of nicotine. The report goes on to describe what happens when a chronic smoker is denied nicotine:

"A body left in this unbalanced state craves for renewed drug intake in order to restore the physiological equilibrium. This unconscious desire explains the addiction of the individual to nicotine."

Conclusion

The information that we have presented today has been the result of painstaking investigation. We now know that a tobacco company commercially developed a tobacco plant with twice the nicotine content of standard tobacco, that several million pounds of this high-nicotine tobacco are currently stored in warehouses, and that this tobacco was put into cigarettes that have been sold nationwide. We now know that several tobacco companies add ammonia compounds to cigarettes, and that one company's documents confirm that one of the intended purposes of this practice is to manipulate nicotine delivery to the smoker. And we now know that some in the industry have identified target ranges of nicotine delivery. These findings lay to rest any notion that there is no manipulation and control of nicotine undertaken in the tobacco industry.

It is equally important to lay to rest, once and for all, the industry's assertion that nicotine is not addictive. Up until very recently, the tobacco industry was able to claim that it did not believe that nicotine was addictive. The release of company documents, and the testimony of company scientists before this Subcommittee, have opened a window on what some senior tobacco officials knew about nicotine's physiological and addictive properties, as much as 30 years ago.

One important thing that every teenager in this country needs to know before deciding to smoke his or her first cigarette is how one cigarette industry official viewed the business of selling cigarettes:

"We are, then, in the business of selling nicotine, an addictive drug ..."[39]

1 Kessler DA. Statement on nicotine-containing cigarettes. Testimony before House Subcommittee on Health and the Environment, 25 March 1994 (see *Tobacco Control* 1994; **3**: 148–58).
2 21 USC § 321(g)(1).
3 Republican Federativa do Brasil, Institute Nacionel da Propriedade Industrial, PI 9203690A, "Variendade de fumo geneticanente estavel e planta de fumo", issued to Brown & Williamson Tobacco Corporation, 4 June 1993.
4 Brazilian Patent No PI 9203690A. US Department of State, official English translation.
5 Letter of JW Johnson, Chief Executive Officer, RJ Reynolds Tobacco Company, to DA Kessler, Commissioner, US Food and Drug Administration. RJ Reynolds Tobacco Company, Winston-Salem, North Carolina; 28 February 1994.
6 Chaplin JF. Tailoring tobacco plants to meet future demands. *World Tobacco* October 1978; **62**: 145–9.
7 Chaplin JF. Breeding for varying levels of nicotine in tobacco. *Proceedings from a symposium on recent advances in the chemical composition of tobacco and tobacco smoke*. Raleigh, North Carolina, 1977: 328–39.
8 [Anon]. Evolving techniques of making cigarettes milder. *World Tobacco* April 1979; 93–101.
9 US patent no 761,312, "Filing of utility patent application," Figure 1.
10 US patent no 761,312, "Appellant's brief on appeal," p 6.
11 7 USC §516. (Tobacco Seed and Plant Exportation Act, repealed on 13 December 1991)
12 7 CFR 34.4(b).
13 DNA Plant Technology did provide a copy of a Phytosanitary Certificate. This document, which certifies that exported plants or seeds conform with phytosanitary regulations of the importing country, was issued to DNA Plant Technology by US Department of Agriculture, Plant Protection and Quarantine, to facilitate importation of 20 g of tobacco pollen into Brazil. 20 March 1990.
14 US patent no 761,312, filed 17 September 1991.
15 Plant Variety Protection Certificate Application, PV No 9100119, filed 21 February 1991, US Department of Agriculture. (Referenced in US patent no 761,312, "Filing of utility patent application," on p 1 – unable to obtain copy of application from USDA).
16 US patent no 761,312, "Rejection of claims", 10 July 1992.
17 US patent no 761,312, "Appellant's brief on appeal", filed 28 February 1994.
18 US patent no 761,312, "Express abandonment of patent application", filed 16 March 1994.
19 Redacted copies of US Customs Service Invoices for Brown & Williamson, dated 21 September 1992.
20 For example, ammonia has been used in efforts to denicotinize cigarettes (US patent no 4,215,706) and, in reconstituted tobacco, for its adhesive properties (US patent no 5,159,942).
21 Reconstituted tobacco can be made (one of several methods) by mixing tobacco stems, dust, and other scraps, adding a liquid solvent to form a "slurry", and then extracting the liquid and pressing the remaining mixture into a flat sheet. Almost all US cigarettes contain some reconstituted tobacco. (Vogues E. Tobacco Encyclopedia, published by *Tobacco Journal International* 1984: 389–90.)
22 US Food and Drug Administration, Center for Drug Evaluation and Research, Division of Drug Analysis. Report on analysis of packages of cigarettes. 4 April 1994.
23 Hertz AN. The flavourist's role in the cigarette design team. *World Tobacco* March 1985: 97–104.
24 Herach J, Libert O, Rogg-Effront C. *Final report on Project Hippo I*. Batelle Memorial Institute, Geneva, for the British American Tobacco Co Ltd, January 1962 (released by Brown & Williamson Tobacco Corp, 16 May 1994).
25 Haselbach CH, Libert O. *Final report on Project Hippo II*. Batelle Memorial Institute, Geneva, for the British American Tobacco Co Ltd, March 1963 (released by Brown & Williamson Tobacco Corp, 16 May 1994).
26 Geissbuhler H, Haselbach C. *The fate of nicotine in the body*. Batelle Memorial Institute, Geneva, for the British American Tobacco Co Ltd, May 1963 (released by Brown & Williamson Tobacco Corp, 16 May 1994).
27 Gilbert DG, Robinson JH, Chamberlin CL, Speilberger CD. Effect of smoking on anxiety, heart rate, and lateralization of EEG during a stressful movie. *Psychophysiology* 1989; **26**: 311–20.
28 Pritchard WS. Electroencephalographic effects of cigarette smoking. *Psychopharmacology* 1991; **104**: 485–90.
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30 Pritchard WS, Gilbert DG, Duke DW. Flexible effects of quantified cigarette-smoke delivery on EEG dimensional complexity. *Psychopharmacology* 1993; **113**: 95–102.
31 Meeting of US Food and Drug Administration officials; William K Dunn, former researcher for Philip Morris, Inc; and counsel to Philip Morris, Inc, Richmond, Virginia (Law Offices of Hunton & Williams), 10 May 1994.
32 RJ Reynolds Tobacco Company. *New cigarette prototypes that heat instead of burn tobacco*. Winston-Salem, North Carolina: RJ Reynolds Tobacco Company, 1988: 457–9.
33 US patent no 3,356,094, Col 1: 8–10.
34 Sir Charles Ellis, Scientific Advisor to the Board of British-American Tobacco Co, July 1962 (as reported by Hilts PJ, in the *New York Times*, 16 June 1994).
35 Sir Charles Ellis, Scientific Advisor to the Board of British American Tobacco Co, July 1962 (as reported by Harris R, for National Public Radio, 14 June 1994).
36 Hutchison K, Gray JA, Massey H (chapter authors). Biographical memoirs of fellows of the Royal Society of London: Chapter on Charles Drummond Ellis. London: Royal Society 1981; 27: 199–233.
37 Excerpt from a British American Tobacco Company research chronology from June of 1967 (as reported by Hilts PJ, in the *New York Times*, 17 June 1994).
38 Excerpt from a 30 May 1993 British American Tobacco Company internal document entitled "Confidential: a tentative hypothesis on nicotine addiction" (as reported by Hilts PJ, in the *New York Times*, 17 June 1994).
39 Excerpt from a July 1963 Brown & Williamson Tobacco Corporation internal document, authored by its General Counsel Addison Yeaman, analysing whether the company should acknowledge the hazards of cigarettes or remain quiet (as reported by Hilts PJ, in the *New York Times*, 7 May 1994).

The economic burden of the global trade in tobacco

Howard Barnum

This paper was presented at the 9th World Conference on Tobacco and Health, held on 10–14 October 1994 in Paris, France. The author is a senior economist at the World Bank. The methodology used to estimate the producer and consumer benefits and the economic costs of tobacco consumption is described in an internal World Bank document which may be obtained from the author (*H Barnum*, The economic costs and benefits of investing in tobacco, *March 1993, 21 pp*). *An editorial commenting on this paper appears on page 295 of this issue of* Tobacco Control. – ED

Abstract

It is well known that tobacco is bad for health. In fact, every ton of tobacco consumed results in approximately one death. What is not so well known is that tobacco is, globally, a net economic disaster as well. There are some benefits to consumers and producers in the form of immediate pleasure and profits that can be estimated from market data, but these market benefits are dwarfed by the cost of sickness and death caused by tobacco use.

Fortunately, there are highly cost-effective policies available to use against tobacco. These policies include taxes, anti-tobacco legislation, information and education, and advertising bans. Cost analysis shows that these policies cost only a fraction per year of life saved compared to the treatment of tobacco-caused disease.

The World Bank has concluded that it does not make good economic sense to lend money for tobacco projects but it does make good economic sense to lend for anti-tobacco activities in health projects. Ministers of finance should take these economic facts into account and should support strong measures to control tobacco use in their countries.

(*Tobacco Control* 1994; 3: 358–361)

Population, Health and Nutrition Department, Human Resources Development and Operations Policy, The World Bank, 1818 H Street, NW, Washington, DC 20433, USA
H Barnum

Introduction

It is an honour and an extraordinary opportunity to speak to this conference. It is an honour because of the dedication with which you are working for better health in spite of the aggressive opposition mounted by those with a vested financial interest in world tobacco trade. It is an extraordinary opportunity because many of you are from ministries of health or work in the health sector in developing countries and, by providing your governments with a focus on the link between health and tobacco, can bring about policies that will eventually save additional millions of lives. I would like to address this group in particular because I know that you face opposition not only from the tobacco trade lobby but also, in some cases, from your ministries of finance.

I intend to give you a message to convey to your ministers of finance. Tobacco is too great a problem to be left to the health sector alone. To obtain better national tobacco policies it is necessary to convince Ministers of Finance that controlling the consumption of tobacco is not only good for people's health but also an important policy for their countries' economic prospects.

"The world tobacco market produces an annual global loss of US$200 billion."

The message I hope to convey is that tobacco use is globally an economic disaster as well as an enormous economic problem in individual countries. This is one economic problem that many countries in the developing world have avoided so far (for example, Africa, parts of Latin America, some Asian countries, and the Middle East), but it is coming. International tobacco companies have targetted the developing world to replace diminishing sales in Western Europe and North America. Fortunately, there are low-cost and effective policies to control tobacco use and, if implemented now, these policies can avoid the waste of billions of dollars in developing countries in the future.

My remarks can be divided into three sections. The first section gives some data on the global economic impact of tobacco use. The second gives a perspective on the current and possible future use of tobacco in developing countries, and the third section illustrates the cost-effectiveness of anti-tobacco policy.

Thus, the three sections state the magnitude of the problem globally, point out the danger for rapidly industrialising nations, and finally point out the economic practicality of addressing the problem.

Table 1 Total world consumption of tobacco (thousands of tons – dry weight)

Region	*1975*	*1985*	*1995*
Developing	2300	3700	5000
Developed	2400	2300	2300
World	4700	6000	7300

Source: FAO

*Table 2 Morbidity and mortality from 1000 tons of added tobacco consumption**

Tobacco-induced disease	*Annual new cases*	*Annual added mortality*
Cancer	230	200
Cardiovascular	440	330
Cerebrovascular	130	50
COPD	190	70
Total	990	650

* Estimated from US data; COPD = chronic obstructive pulmonary disease

The global economic burden of tobacco

GLOBAL CONSUMPTION

Turning to the first section, table 1 gives estimates from the Food and Agriculture Organisation (FAO) of the global consumption of tobacco for 1975 to 95. Globally, consumption is expected to have increased by over 50% from 1975 to 95. All of this increase comes in developing countries where consumption is to double. In developed countries consumption will actually have fallen from 1975 to 95.

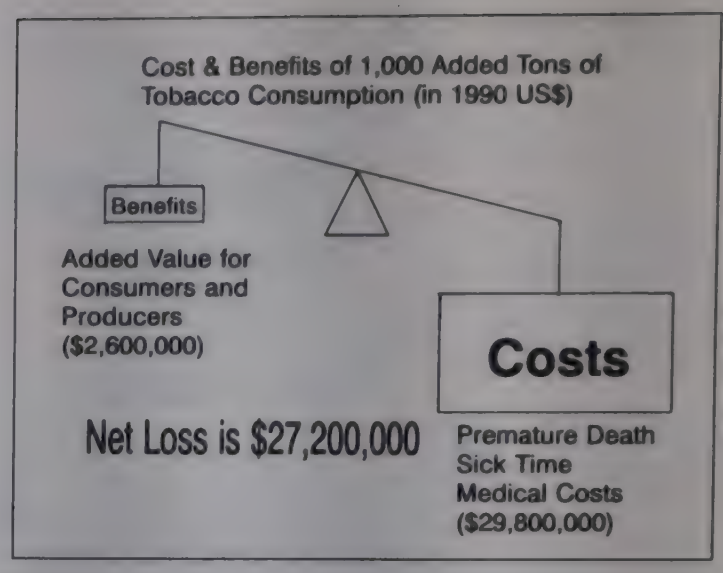
Mortality from global tobacco consumption

The tobacco traded in the global market adds a net loss to world welfare. There is, of course, some short-term consumer satisfaction and added producer profits, but these benefits are dwarfed by the cost of morbidity and mortality caused by tobacco use.

Globally, tobacco caused 3 million deaths in the last year and is expected to cause 10 million deaths a year by 2025. One in eight deaths in less developed countries is caused by tobacco, one in four in developed countries, and one in six for the world as a whole.

Morbidity and mortality from 1000 added tons of consumption

To get some idea of the economic impact of these deaths and the associated illness, we estimated the global effect of adding 1000 tons of tobacco consumption. In a background paper prepared for the World Bank – to help examine the wisdom of our policy of not lending for tobacco – we estimated the producer and consumer benefits from tobacco consumption and compared them to the economic costs.



Figure

We have estimated, based on US Surgeon General data, that one ton of tobacco consumed causes an average of about 0.65 deaths, with an average lag of 25 to 30 years*. Table 2 gives a breakdown of the number of deaths and new cases of illness from 1000 tons of added tobacco consumption. These are premature deaths and new cases distributed over a 30-year period into the future.

Costs and benefits of added consumption of 1000 tons

With this breakdown by types of disease we can now look at the cost of illness from the 1000 tons of tobacco consumption and compare this with the benefits of consumption (table 3).

Value for consumers and producers Consumers derive immediate value, pleasure, from their consumption of tobacco. Producers also derive benefit, their profits, from the market for tobacco. There are economic methods for calculating the benefits of the consumption to producers and consumers. These involve an application of the estimated demand and supply responses characteristic of the market for tobacco. Using 1990 prices, we estimated that the added value for consumers and producers is US $2.6 million.

Direct costs The medical burden of the consumption is obvious. Cancer, cardiovascular, cerebrovascular, and chronic obstructive pulmonary diseases are expensive to treat. The estimated direct costs of treatment are US $5.6 million.

New estimates using recent data (Peto R, Lopez A, Boreham J, Thun M, Heath C Jr. *Mortality from smoking in developed countries 1950–2000*. Oxford: Oxford University Press, 1994) suggest that the number of deaths from one ton of tobacco consumption may be closer to 1.3. If so, this would approximately double the estimated net economic costs of tobacco consumption.

Table 3 Costs and benefits from 1000 ton increase in tobacco consumption (in 1990 million US $)

Effect	*Benefits*	*Costs*	*Net benefits*
Consumer & producer benefits	2.6		2.6
Premature death		13.2	−13.2
Indirect morbidity costs		11.0	−11.0
Direct morbidity costs		5.6	−5.6
Total	2.6	29.8	−27.2

Table 4 Selected cancer types as a percentage of all cancer by region (regional totals are 100%)

Region	*Mouth*	*Lung*
Sub-Saharan Africa	5.3	5.8
Middle East	7.2	15.1
India	19.5	7.2
Other Asia	9.2	13.3
South America	5.1	8.7
China	3.4	12.0
Former USSR and Eastern Europe	4.2	26.5
Developed economies	3.3	22.4
World	6.8	15.1

Table 5 Rate of growth of tobacco consumption (percent per year)

Region	*1975–85*	*1985–90*	*1995–2000*
Developing	4.8	3.4	2.7
Developed	−0.4	−0.2	−0.0
World	2.4	2.1	1.9

Source: FAO projections

Indirect costs In addition there are the so-called "indirect costs" of the economic value of the years of life lost to morbidity (US $11 million) and premature mortality (US $13.2 million).

Summing all of the benefits and costs, the 1000 added tons of consumption produces a global net loss of $27 million (see figure). Obviously, from a global point of view, the production and consumption of tobacco is not a very good deal.

Global net economic loss from tobacco consumption

If we extrapolate the estimated net loss from 1000 tons to the 7 million tons produced in the world in 1990, we can get a very rough estimate of the global economic loss from tobacco. Using this approach, the world tobacco market produces an annual global loss of $200 billion. About one third of this loss occurs in developing countries.

Socioeconomic change Urbanisation and access to mass media and education, at least initially, have acted to increase smoking in many countries. Increased income is, however, one of the most important factors. We have estimated that a 10% increase in *per capita* income can be expected to increase tobacco consumption by 7% in middle-income countries, and by more than 13% in low-income countries.

Developing countries

I will now consider the situation in developing countries.

CURRENT SITUATION

Until now, the developing world has felt only a small part of this economic loss, but the future could be very different. Lung cancer, although only one of the several health effects of tobacco, is a good indicator of the health burden from tobacco use, at least as far as smoking is concerned. This is because, in the absence of smoking, lung cancer is actually a minor and relatively rare disease.

Table 6 Key factors affecting growth in tobacco consumption in developing countries

Factor	*Potential effect*
Population growth	+
Aging of population	+
Socioeconomic change:	
Income	++
Urbanisation, communication, education	++
Price of tobacco	depends on policy
Demand shift:	
Advertising	+++ (if no policy)
Health information	depends on policy
Regulation, norms	depends on policy

+, small effect; ++, large effect; +++, very large effect.

Table 4 shows that in comparison with the rest of the world, lung cancer in the developing world accounts for a much smaller percentage of total cancer in men. The relative percentage for women is even smaller. If world tobacco companies have their way, however, this picture will change in the future. In fact, because current lung cancer is based on past consumption with a long lag, the recent increase in tobacco consumption that has already occurred in part of the developing world will cause an inevitable increase in illness in the future.

PROJECTED GROWTH RATES

The projected growth rate of tobacco consumption in developing countries is expected to be about 3% for 1995–2000, barring new national policies that would thwart the current trend. This compares with no growth or decline for the developed world (table 5).

FACTORS AFFECTING CHANGE IN TOBACCO CONSUMPTION

It is useful to examine the factors behind the expected growth because the investigation may have some policy implications. The major factors that will affect change in tobacco consumption in developing countries are indicated in the chart below.

Demographic change The first two factors are the natural increase in population and the aging of the population. As children move upward through the population pyramid to reach adolescence and young adulthood – the age at which many people start smoking – the consumption of tobacco will increase.

Socioeconomic change Urbanisation and access to mass media and education, at least initially, have acted to increase smoking in many countries. Increased income is, however, one of the most important factors. We have estimated that a 10% increase in *per capita* income can be expected to increase tobacco consumption by 7% in middle-income countries, and by more than 13% in low-income countries.

These two factors – demographic and socioeconomic change - are factors that governments do not control. Their effects are inexorable. There are, however, factors affecting change over which governments can exert considerable policy control. These include:

Table 7 Cost per year of life gained from different health interventions (in a country with GDP = US$ 2000)

Intervention	*US$ per year of life gained*
Prevention	
Anti-smoking	20–40
Measles immunisation	15–20
Cervical cancer screening	100–500
Treatment	
Oral cancer	1000
Lung cancer	18000

Retail tobacco prices Cigarette prices, greatly affected by excise taxes, have strong effects on the number of new starters and lesser effects (but positive) on smoking cessation. Some estimates suggest that a 10% increase in cigarette prices reduces new starts by almost 15%. The price responsiveness of teenagers is expected to be even greater in the lowest income countries.

Factors affecting demand shift The most important factor affecting consumption is advertising and promotional schemes of tobacco companies. Marlboro cowboys, cool Camels, and other advertising gambits greatly affect the rate of smoking by young people. Experience around the world, however, has shown that government health information campaigns, regulation, and other government policies can help to offset efforts by tobacco companies to expand tobacco markets.

To avoid the high economic cost of increased tobacco consumption, developing countries need to act now to implement policies to offset the effects of socioeconomic change and tobacco company promotion on future tobacco use.

The cost-effectiveness of tobacco policy

The World Health Organisation has developed a set of booklets that outline effective anti-tobacco policies in great detail. I would like to give you the results of an examination we did of the potential cost-effectiveness of similar programmes in comparison to other health interventions.

Table 7 gives the number of years of life gained from different health interventions that compete for the scarce resources available to a Ministry of Health. An anti-smoking campaign costs between US$ 20 and 40 per year of life gained. This compares to US$ 18000 per year of life gained from lung cancer treatment.

In general, anti-smoking campaigns are among the most cost-effective measures to improve health and are surpassed only by childhood immunisations. By spending less on treatment and more on anti-smoking efforts, many more years of life can be saved with the available resources.

WORLD BANK POLICY

The World Bank has become so impressed with these facts – that is, the global economic burden of tobacco and the cost-effectiveness of ant-tobacco policy – that three years ago our board of directors confirmed a policy (see box) which had become *de facto* over the previous 10 years:

Bank operations include anti-tobacco activities in sector work, policy dialogue, and lending operations.
The Bank does not lend for tobacco production, processing, imports, or marketing, whether for domestic consumption or for export.

Conclusion

This, then, is the simple message. Tobacco consumption provides a net economic loss, and anti-tobacco policies are a cost-effective way to save lives and benefit the economy. I hope you are convinced and will convey this message to your ministers of finance.

World Bank policy on tobacco

In 1992, in recognition of the adverse effects of tobacco consumption on health, the World Bank articulated a formal policy on tobacco. The policy contains five main points.

- The World Bank's activities in the health sector – including sector work, policy dialogue, and lending – discourage the use of tobacco products.
- The World Bank does not lend directly for, invest in, or guarantee investments or loans for tobacco production, processing, or marketing. However, in the few countries that are heavily dependent on tobacco as a source of income and of foreign exchange earnings (for example, those where tobacco accounts for more than 10 percent of exports) and especially as a source of income for poor farmers and farmworkers, the World Bank treats the subject within the context of responding most effectively to these countries' development requirements. The World Bank seeks to help these countries diversify away from tobacco.
- To the extent practicable, the World Bank does not lend indirectly for tobacco production activities, although some indirect support of the tobacco economy may occur as an inseparable part of a project that has a broader set of objectives and outcomes (for example, rural roads).
- Unmanufactured and manufactured tobacco, tobacco-processing machinery and equipment, and related services are included on the negative list of imports in loan agreements and so cannot be included among imports financed under loans.
- Tobacco and tobacco-related producer or consumer imports may be exempt from borrowers' agreements with the Bank to liberalize trade and reduce tariff levels.

Source: World Bank. *World development report 1993: Investing in health*. Oxford: Oxford University Press, 1993; 89.

School structural and policy variables associated with student smoking

Valerie Clarke, Victoria White, David Hill, Ron Borland

Abstract

Objective **– To assess the relationships between school structural and smoking policy variables and students' self-reported smoking.**

Design **– Questionnaire data relating to schools were collected from teachers and data relating to self-reported smoking were collected from students.**

Setting **– Australian secondary schools.**

Participants **– One teacher from each of 347 schools and 26429 students from these schools.**

Main outcome measure **– Self-reports of smoking.**

Results **– For each school the percentages of students who had smoked in the last week, month, and year were obtained for three groups of students: (*a*) years 7 and 8, (*b*) years 9 and 10, and (*c*) years 11 and 12. For consistency across time periods, reporting was limited to smoking in the last week. Schools varied in the proportions of students who reported smoking. School-based variables related to smoking more consistently for the younger students, for whom smoking was more prevalent in schools which were (*a*) co-educational rather than single-sex, (*b*) government rather than non-government, (*c*) had a student representative on the school council, (*d*) did not have a house system, and (*e*) did not have a past students' association. For older students smoking prevalence was positively related to non-English speaking background. For all groups, smoking prevalence was unrelated to (*a*) school location (rural or urban), (*b*) school size, (*c*) means of selecting prefects, (*d*) student smoking policy, (*e*) staff smoking policy, (*f*) staff smoking prevalence, (*g*) visitor smoking policy, and (*h*) school no-smoking signs. Specialised health education programmes related positively to smoking, probably as these programmes were introduced into the schools with greater smoking prevalences. When the variables which were significant individually were entered into regression analyses to predict smoking there were few significant relationships.**

Conclusion **– School-based structural and smoking policy variables have minimal association with students' reported smoking behaviour.**

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As mortality rates related to tobacco use are higher among those who begin smoking at younger ages,[1] smoking among secondary students is a serious health problem. In addition, because teenage smoking is a major determinant of adult consumption,[2] with most adults who smoke taking up smoking by the age of 18 years,[3] reducing the number of teenagers who smoke is one way to reduce the number of adult smokers. Identifying factors that influence teenagers to smoke has become a focus of considerable research activity.

Of the many agencies of socialisation that influence the developing teenager, the family, school, peers, and the mass media all play a significant role. While the roles of the family, peers, and media in teenage smoking behaviour have been studied extensively, the impact of the school environment on smoking behaviour has been neglected by most researchers. Recently the influence of school characteristics and policies (particularly those regarding student and staff smoking) on the smoking behaviour of students has begun to gain attention. This is in part due to health authorities encouraging schools to develop policies on smoking as a way of raising the issue of teenage smoking in schools. School policies on smoking may be as simple as stating whether smoking is permitted on school grounds by students or teachers, including the types of disciplinary procedures taken if smoking regulations are transgressed; or they may be more complex by addressing the type of smoking education included in the school's curriculum. While there appears to be an increase in the number of schools developing these policies, there is little research describing school policies. Thus it is hard to determine the types of policies schools are developing and the numbers of schools which have smoking policies. The present paper sets out to describe the types of policies and educational programmes related to smoking currently operating in schools throughout Australia.

Although research has shown that smoking prevalence rates vary greatly across schools,[4] there has been little consideration of school-structural or smoking policy factors in relation to smoking prevalence. Research that has focused on school variables has reported conflicting results. Conrad, Flay, and Hill[5] identified eight studies which found that smoking onset related to school climate variables, such as academic values and achievement, problem behaviour, attitudes about discipline, and involvement in extra-curricular

activities. However, these variables were related to the climate of the individual school and thus shed little light on the impact of school structural and policy variables on adolescent smoking.

Research in the UK which has investigated school structural variables has shown smoking prevalence to be higher in secondary modern schools than in grammar schools,[6,7] in single-sex than in co-educational schools,[7] and in schools where both students and staff could smoke.[6] On the other hand, Australian data suggest that smoking was more prevalent in government than non-government schools and in co-educational rather than single-sex schools.[4]

Research conducted in the UK has also found smoking prevalence to be positively related to the number of teachers who smoke[8] and negatively related to optional school uniform,[7] and school discipline policy related to smoking.[9] However, smoking was unrelated to catchment area (rural, suburban, urban),[7] presence or absence of a sixth form (catering for 17- and 18-year-old students), or type of pastoral care programme (vertical or year grouping).[7] In both Australia and the UK no relationship has been found between smoking and the provision of health education,[4,6] or school size.[4,7]

Research in the US looking at the impact of smoking policies in schools on the smoking behaviour of students is limited. Pentz *et al*[10] examined the effects of smoking policy on the prevalence of smoking and amount smoked by year 7 students. Results of this study suggest that more comprehensive smoking policies are marginally related to lower prevalence rates of smoking among students. Policies which tended to be more punitive had no effect on the smoking behaviour of students. This study showed that policy was related more to the amount year 7 students smoked than to smoking prevalence.

Given the limited and somewhat conflicting research findings cited above, we have little knowledge about the impact of such policies or even structural factors on the smoking behaviour of students. Determining whether school structural characteristics or policies relate to the smoking behaviour of secondary students has practical relevance in identifying the types of schools and policies which might be the target of smoking prevention education programmes. In addition, any relationship between policies and students' smoking would add to our theoretical understanding of adolescents' smoking behaviour.

The present paper also aims to relate these policies and structural characteristics to prevalence of smoking in the schools. It describes the prevalence and types of smoking policies and education programmes occurring in Australian secondary schools. In addition, particular school structural variables are reported. The paper then examines the relationship between school characteristics and prevalence of smoking among secondary students. Data for this report were collected in 1990 in conjunction with a survey of smoking and alcohol use among Australian secondary schoolchildren (SSASS). In addition to the survey of students, a school-based survey was used to collect data about the characteristics of the school structure, organisation, and health education curriculum. Due to the inconsistencies in previous research, no clear predictions were made.

Method

SAMPLE

A total of 351 secondary schools participated in the SSASS survey in 1990. Detailed descriptions of both the sampling and administration procedures are provided elsewhere.[11] In brief, a stratified two-stage sample design was used. In the first stage, two random samples of secondary schools were drawn, one from schools enrolling students in years 7 to 10 and the other from schools enrolling students in years 11 and 12. Schools were selected on a probability proportional to the school size as indicated by the number of year 8 to 10 students in the junior sample and the number of year 11 and 12 students in the senior sample. The schools were selected so that the number of schools of each type reflected the proportion of schools of that type within each state. Eighty students were then drawn randomly from each school selected. In the years 7 to 10 sample there were 20 students from each year level. In the year 11 and 12 sample there were 40 students from each year level.

QUESTIONNAIRES

Questionnaires addressing school-based issues were obtained from 347 of the schools participating in the SSASS study. This questionnaire addressed objective facts about the general characteristics of the school, issues of organisation, the provision of health education within the school curriculum and the inclusion of smoking within this curriculum, the use of Anti-Cancer Council (ACC) materials, and the existence of school policies in relation to smoking for students, staff, and visitors.

Student questionnaires addressing issues of smoking and alcohol use were completed by 26429 students. These provided the basis of estimating the percentages of students who smoked in each school by various year levels. The questions of relevance here asked students if they had smoked in the last week, the last month, and the last year. Students also indicated whether they had had any lessons about smoking in the previous school year. Although student self-reports of smoking were not verified, studies assessing the relationship between self-reports and physiological measures show that self-reports of smoking in questionnaires are reliable.[12,13]

ANALYSES

The results are presented in two sections. The first section provides a description of the schools' policies and practices. Frequencies and cross-tabulation procedures were used to

analyse the data from the school survey. Due to rounding, percentages may not add to 100. The second section examines the relationship between these variables and student smoking prevalence. To relate school-based variables to smoking prevalence, the data from the students' survey were aggregated at the school level and the percentages of students smoking in year levels 7 and 8, 9 and 10, and 11 and 12 for each school were determined. Similarly, the percentages of students recalling lessons about smoking were calculated for each school for the three year-level groups. For the categorical variables analysis of variance procedures were used to examine the relationships between school factors and smoking prevalence. For the continuous variables, Pearson correlations were used to avoid losing data. The prevalence of smoking in the past week was then employed as the dependent variable in multiple regression analyses to determine the relative contribution of the variables found to relate to smoking in the independent analyses.

The significance level was set at 0.05. Given the number of comparisons we recognise that some significant results may be Type 1 errors. However, as this is an exploratory study we thought it desirable to identify the majority of factors which may influence smoking in schools.

Results

THE NATURE OF THE SCHOOLS

School characteristics

Sixty-one per cent of participating schools were government schools, 23% were Catholic, and 16% were independent. Eighty-one per cent of schools were co-educational, 10% were girls' schools, and 9% were boys' schools. Locations varied from inner capital city (18%) and capital city (41%), to large provincial city (5%), small provincial city (16%), large town (9%), and small town (11%). A quarter of the schools contained some primary level classes. Total enrolments varied from 110 students to 930 students, with an average of 740 students. Ethnic composition also varied. Although it was estimated that for 82% of schools there were less than 20% of students from non-English speaking backgrounds (NESB), this figure exceeded 60% of years 7 to 10 students in 8% of schools and exceeded 60% of years 11 and 12 students in 5% of schools.

School organisation

Over three-quarters (76%) of the schools had a compulsory school uniform, while in 18% of schools wearing of the uniform was optional, and 4% of schools did not have a school uniform. Sixty-two per cent of schools had some form of prefect (school orderly) system. The students had a major role in the selection of prefects in most schools (94%), with very few schools having prefects appointed solely by the principal and/or staff (6%). Eighty-six per cent of all schools had a student representative on the school council, with these being elected solely by the students in 85% of schools. Most schools (79%) had some form of house system, which organised students into groups for social and/or sporting purposes. House meetings were relatively infrequent, being held several times a week (3%) or weekly (3%) in very few schools, with 22% having meetings several times a term, 17% having them once a term, 16% rarely, and 31% not indicating a regular pattern.

Health education

Most schools (98%) had some health education at some stage during their secondary programme. However, there was considerable variation in the years in which it was taught and whether or not such courses were compulsory. The percentages of schools which provided health education at each of the levels from year 7 to year 12 are shown in the upper part of table 1. Approximately 90% of schools offered a health education programme at each year level from years 7 to 10, 75% of schools offered one in year 11, and 59% of schools in year 12. Most schools (82%) had a teacher assigned to health education.

The length of time smoking education had been included in the curriculum of schools varied from 1 to 20 years, with a mean of 6.4, a median of 5.0, and a standard deviation of 3.7. Smoking education was more common in years 7 to 10 than in years 11 and 12.

Health education was located in different parts of the curriculum in different schools, and in many cases was included within more than one discipline. Of the 322 schools teaching some component of health education, 54% had at least one specialised subject devoted to health education, while 52% included it as part of physical education, 31% as part of science, 23% within pastoral care, 3% in drama, and 23% in other unspecified subject areas.

Materials

Seventy per cent of schools made some use of smoking materials developed by one of the cancer organisations, and a further 21% of schools make extensive use of these materials. Only 6% of schools stated that they made no use of these materials while for a further 3% of schools the question was not applicable, presumably as they do not teach about smoking.

Table 1 Percentages of schools offering health education programmes at each year level and percentages of schools which include smoking as part of that programme

	Year level					
Health education	*7*	*8*	*9*	*10*	*11*	*12*
Presence of programme						
none	10	11	10	9	35	41
at least one	90	89	90	91	75	59
Type of programme						
elective	4	5	14	22	60	47
compulsory	86	84	76	69	15	12
Includes smoking	43	53	46	39	17	12

Smoking awareness
In the 12 months preceding the survey, 42% of the schools had not used any special activities to raise students' awareness of the health hazards of smoking, while 58% had tried to raise awareness, using a variety of techniques. The most popular was the use of displays, mentioned by 33% of schools, although a few schools had used drama (8%), social situations (3%), or other unspecified techniques (15%).

Smoking policy for students
Nearly all schools (97%) prohibited smoking for all students on all occasions, although two schools allowed smoking in certain areas, one school allowed it off the school premises, and six schools have other unspecified policies. All schools took some form of action when students were caught smoking. However, there were many different types of action taken, and many schools took different types of actions on different occasions, often depending on whether it was a first, second, third, or later offence. The most frequently reported actions were: contacting the pupil's parents (74% of schools), suspending students (52%), detention (50%), issuing a warning (26%), and providing or recommending health education counselling (29%). Relatively few schools required additional assignments (7%), or expelled students from the school (5%). Generally, a within-school punishment was followed by parental contact, with suspension or expulsion occurring in response to a third or fourth offence.

Staff
In 48% of schools teachers were prohibited from smoking, while there were no restrictions on staff smoking in only 6% of schools. In 89% of schools it was estimated that less than 20% of the teachers were smokers, while in the remaining 11% of schools it was estimated that between 21% and 40% of teachers were smokers.

Visitors
A fifth of the schools had no restrictions on smoking by visitors to the school while 32% allowed visitors to smoke in some areas; 41% did not allow visitors to smoke at all, and the remaining 7% had some other unspecified policy in relation to visitors. Very few schools claimed to have "no smoking" signs in "most parts" of the school (7%), although 63% of schools had such signs in some parts of the school, and the remaining 30% of schools did not have any signs.

SCHOOL-BASED VARIABLES AND STUDENT SMOKING

To relate school-based variables to student smoking the six year-levels were combined into three groups: years 7 and 8, years 9 and 10, and years 11 and 12. Percentages of students who had smoked in the three time periods for each age group within each school were calculated, and means were calculated across schools. The means and standard deviations obtained are presented in table 2. An examination of this table shows that smoking increases from years 7 and 8 to years 9 and 10 and further increases from years 9 and 10 to years 11 and 12. This pattern is consistent across smoking in the last week, the last month, and the last year.

The large standard deviations suggest that there is considerable variability between schools. The remainder of this paper will attempt to identify the factors which may relate to this variability.

For each year level group, three one-way analyses of variance were computed to identify the relationship between the school-based variables and the proportion of students who said they were smokers. As the findings within each age group were consistent across the three time periods and as smoking in the last week gives an indication of regular smoking, in the interests of brevity and clarity further discussion will focus on this one dependent variable. The mean scores and associated F values for smoking in the last week are presented in table 3. For continuous variables, Pearson correlation coefficients were computed. These are reported in the text.

School type
For students in years 7 to 10, school type was related to smoking with a higher proportion of students smoking in government schools than in independent or Catholic schools. However, this relationship was not found among senior students.

Sex composition
The sex composition of the school was only related to the proportion of years 7 and 8 students reporting having smoked. The results indicate that there was more smoking in co-educational schools than in boys' schools and more smoking in boys' schools than in girls' schools.

Uniform
The prevalence of smoking in years 7 to 10 was lower in schools with a compulsory school uniform than in schools where there was no uniform or it was optional. However, the prevalence of smoking among senior students was not related to the school's uniform policy.

Table 2 Percentages of students reporting smoking: means (standard deviations)

Year levels	*Smoked last week*	*Smoked last month*	*Smoked last year*
7 and 8	8.75 (9.26)	11.28 (10.09)	21.48 (13.19)
9 and 10	22.85 (9.87)	26.42 (10.82)	40.76 (12.50)
11 and 12	27.34 (15.85)	31.57 (15.84)	46.51 (15.90)

Table 3 Mean percentages of students in years 7 and 8, 9 and 10, and 11 and 12, who have smoked in the last week in relation to each of the categorical school-based variables

School variables	Years 7 & 8		Years 9 & 10		Years 11 & 12	
	Mean	F (df)	Mean	F (df)	Mean	F (df)
Sex composition						
Girls	4.5		20.4		24.2	
Boys	6.8	3.37*	21.3	< 1	24.1	< 1
Co-educational	8.7	(2,238)	22.8		28.3	
School location						
City	8.3	< 1	22.5	< 1	28.4	< 1
Rural	8.1		22.0		21.0	
School type						
Government	9.8		24.0		28.3	
Catholic	5.7	9.79***	19.6	5.20***	26.9	< 1
Independent	5.4	(2,235)	19.8	(2,208)	26.9	
Proportion of years 7 to 10 from NESB						
0–20%	8.6	2.01	23.1	< 1	29.7	2.70
21–100%	6.8	(1,209)	21.5		22.7	(1,87)
Proportion of years 11 and 12 from NESB						
0–20%	9.0	2.57	22.9	< 1	31.2	4.81*
21–100%	6.5	(1,165)	21.3		22.2	(1,97)
School uniform						
Not compulsory	10.4	6.37*	25.5	4.75*	25.9	< 1
Compulsory	7.6	(1,235)	21.7	(1,208)	28.1	
Selection of prefects						
Principal	6.0		20.5		20.8	
Staff	9.2	3.16	22.1	< 1	29.4	< 1
Students	6.3	(2,139)	20.5		26.4	
Student representative on school council						
No	5.8	6.05*	22.0	< 1	27.6	2.07
Yes	9.0	(1,221)	22.8		21.7	(1,90)
Houses						
No	10.6	6.38*	23.2	< 1	31.4	2.09
Yes	7.6	(1,237)	22.2		26.6	(1,108)
Past students' association						
No	8.8	4.16*	23.5	6.30*	27.4	< 1
Yes	6.7	(1,237)	20.0	(1,210)	27.9	
Staff smoking policy						
Not allowed	7.5		22.6		27.2	
Some areas	9.1	1.54	22.6	< 1	27.8	< 1
No restrictions	6.9	(2,237)	20.4		30.9	
Proportion of staff who are smokers						
0–20%	8.0	< 1	22.0	2.18	27.9	< 1
21–100%	9.1		25.2	(1,207)	25.9	
Visitor smoking policy						
Not allowed	8.8		22.9		30.6	
Some areas	8.5	< 1	24.3	1.91	26.2	1.64
No restrictions	7.4		20.5	(2,191)	24.1	(2,99)
Smoking signs around the school						
None	8.1		21.7		26.3	
Few	8.3	< 1	22.2	2.35	28.5	< 1
Most parts	7.8		28.1	(2,210)	27.3	
Health education teacher						
No	5.3	8.71**	18.8	5.10*	25.1	< 1
Yes	8.8	(1,239)	23.0	(1,212)	28.1	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

School size

School size was not significantly related to the proportion of students in years 7 and 8, ($r = 0.02$), years 9 and 10 ($r = 0.04$), or years 11 and 12 ($r = 0.14$) who smoked.

School location

Whether the school was located in an urban or rural area was unrelated to the proportion of students who smoked at any year level.

Language spoken at home

The teachers were asked to estimate the proportions of students in years 7 to 10 and in years 11 and 12 who were from non-English speaking backgrounds (NESB). NESB was unrelated to smoking for students in years 7 to 10 but, for the senior students, smoking was less prevalent where there were more NESB students.

School organisation

Among students in years 7 and 8 there was less smoking where (*a*) there was not a student representative on the school council, (*b*) there was a house system, and (*c*) there was a past students' association. None of these variables related to smoking prevalence for students in years 11 and 12.

Health education

Smoking was greater among students in years 7 to 10 where the school employed a health education teacher but this factor was unrelated to smoking for students in years 11 and 12. Smoking was more prevalent among year 9 and 10 students in schools where the year 9 health education programme included a component on smoking (smoking component included: mean = 24.5, smoking component not included: mean = 20.4; $t(206) = 3.0$, $p < 0.01$). The relationship between smoking prevalence and including a smoking component in health education was not significant for other year levels.

For year 7 and 8 students, the number of years for which the school had included smoking education as part of its health edu-

cation curriculum had a significant positive association with the proportion of students who had smoked in the last week ($r = 0.15$, $p < 0.05$). A similar association was found between the proportion of year 11 and 12 students who smoked in the last week ($r = 0.23$, $p < 0.01$), but this variable was unrelated to smoking prevalence for students in years 9 and 10 ($r = -0.13$, ns). The possible reasons for this unexpected positive association were explored further. To test the hypothesis that smoking education had been introduced into the schools with a greater smoking prevalence, comparisons were made between those schools for which smoking education had been introduced during the last six years, and those which had had smoking education for a longer period of time. Six years was selected as the cut-off as this was the period of time for which the eldest members of the sample had been at secondary school. There were no significant differences for students in years 7 to 10, but for students in years 11 and 12 smoking was more prevalent where smoking education had been taught for more than six years (mean = 37.41) than where it had been taught for six years or less (mean = 23.48): $t(80) = 3.53$, $p = 0.001$. As students in years 7 and 8 had only been at the school for one or two years, and students in years 9 and 10 for three or four years, the analyses were repeated using the appropriate number of years as the dividing point, but no significant differences were found.

The relationship between the location of health lessons and the percentage of students who recall lessons about smoking was also examined. As recall of lessons in the previous school year was the focus of the question, it is worth noting that some students may not have been at their current school and so associations will be weakened. However, this analysis may help to gain an understanding as to whether the location of health lessons in particular subjects is associated with greater recall. No significant associations were found between location of health education and recall of lessons for students at any year level.

The proportion of year 7 and 8 students recalling lessons about smoking was not related to the proportion of students in these years smoking, and no association between these variables was found for students in year 9 and 10. However, a positive relationship was found between the proportion of year 11 and 12 students recalling lessons and the proportion of these students smoking in the last week ($r = 0.29$, $p < 0.01$).

Smoking policies for adults

Staff smoking policies and visitor smoking policies, and the presence or absence of "No smoking" signs were unrelated to reported student smoking.

OVERALL IMPACT OF SCHOOL VARIABLES

As many of the variables examined above are related to one another, the relative impact of the school variables on the prevalence of smoking was assessed by using three, stepwise multiple regression analyses. In each analysis the independent variables were sex composition, school type, non-English speaking background, uniform, selection of prefects, selection of student representative council members, presence of houses, student smoking policy, and presence of smoking education. Separate analyses were conducted for each of the three year groupings.

For students in years 7 and 8 smoking was inversely related to presence of a house system ($F(1,211) = 7.39$, $p < 0.001$), and attending a Catholic school (F change $(2,210) = 6.46$, $p < 0.05$) or an independent school (F change $(3,209) = 6.98$, $p < 0.01$). Collectively these variables explained 8% of the variance (adjusted $R^2 = 0.080$, $F(3,209) = 7.13$, $p < 0.001$). For students in years 9 and 10, only one variable entered into the equation, that of having a smoking component in the health education programme ($F(1,189) = 78.07$, $p < 0.01$). The prevalence of smoking was greater among those schools with a smoking-and-health programme at year 9 level, but this explained less than 4% of the variance (adjusted $R^2 = 0.036$). For years 11 and 12, two variables were significant, explaining 12% of the variance (Adjusted $R^2 = 0.122$, $F(2,95) = 7.76$, $p < 0.001$). Smoking was less prevalent in schools which had a house system ($F(1,96) = 9.48$, $p < 0.01$) and in schools with a higher proportion of NESB students (F change $(2,95) = 5.60$, $p < 0.05$).

Discussion

Smoking was prohibited for all students in the vast majority of schools surveyed. In nearly half the schools (48%) the staff were not permitted to smoke anywhere on campus. If students were caught smoking, generally some form of punitive action was taken by the school. However, there was no significant association between student smoking and staff smoking policy, proportions of staff members who smoke, visitor smoking policy, and placement of no-smoking signs around the school. This may suggest that the school smoking policy has little effect on students' reported smoking behaviour. However, as we did not ask about the length of time these policies had been in place it may be that they were too recent to have had a detectable impact. Further, the extent to which students are aware of these practices and policies was not assessed.

Although health education is currently included in the curriculum of the majority of Australian schools, the length of time for which health education had been taught and where it was included in the curriculum varied greatly between schools. Health education became less common with increasing year levels. Education about the dangers of smoking was a relatively recent phenomenon, and was also more common in the junior than senior year levels. The restriction of health education predominantly to junior-year levels is unfortunate given that many students are taking up smoking in their senior years. The way in

which health education was integrated into the curriculum also varied between schools. However, it is encouraging that in schools where health education occurred, over 50% had a specialised subject devoted to health education.

There was a positive association between the number of years smoking education had been taught in the school and the prevalence of smoking. This result was unexpected and was investigated further. The additional analyses comparing the prevalence of smoking in schools which had had smoking education programmes for six years or less with those which had had them for more than six years showed that, for students in years 11 and 12, smoking was significantly more prevalent in the schools which had had smoking education programmes for more than six years. This finding is consistent with the proposition that schools which see themselves as having a problem with student smoking may be more likely to have introduced smoking education programmes. It is possible that in the absence of such programmes, smoking may have been even more prevalent.

Alternatively, the impact of the programme may depend on its nature. Pentz *et al*[10] found that a punitive school smoking policy had no effect on smoking prevalence. Our data are limited in that there is no information as to the content or quality of the smoking education programmes, or the possibility that students may be rebelling against a perceived strong stand by the school. Finally, we only examined the association between smoking education programmes and prevalence of smoking within schools. Other researchers have shown that while prevalence may not be affected by school policy, amounts smoked may be.[10] Education about smoking may not stop students from experimenting with tobacco but may reduce the number of cigarettes consumed.

When the set of school-based variables was used as independent variables in a series of regression analyses, there were limited effects. For students in years 7 and 8 the most important variables were house system and school type, with smoking being less prevalent in schools with a house system and in catholic and independent schools than in government schools. Although there were additional variables which were significant in the separate analyses (sex composition, school uniform, student representative council, past students' association, and presence of a health education teacher), these variables may all be related to school type, which may also be related to the presence or absence of a house system. The finding of a relationship between school type and smoking prevalence is consistent with earlier research,[4,6,7] although it only explains 8% of the variance.

For students in years 9 and 10, the major variable associated with smoking prevalence was the presence of a smoking education programme at the year 9 level. Although school type, school uniform, and past students' association were significant in the separate analyses, these effects were not evident in the combined analysis. As this is the age group where rebellion against authority is strongest, students may be deliberately experimenting with smoking as they have been encouraged to avoid this behaviour. Again, a consideration of the amount of smoking could be useful.

For students in years 11 and 12, the findings for the composite analysis are consistent with those for years 7 and 8, showing that smoking is less prevalent in schools with a house system. Additionally, the regression analysis confirmed the findings of the analyses of variance, again highlighting NESB as one of the main factors relating to lower smoking prevalence. Although a greater amount of the variance is explained for students at these senior levels than for those at lower levels, part of the variance is due to NESB, which reflects home rather than school characteristics.

Over all year levels, the limited association of these school structural and policy variables confirms the findings of the analyses of variance and simple correlations and substantiates the conclusion that school-based variables have a limited impact on reported student smoking prevalence. To the extent that school variables are relevant, they seem to reflect the extent to which students are encouraged to develop both leadership roles and a sense of identity within a house system, rather than to essentially structural characteristics of the school. This may suggest that structural variables are less consequential than school climate variables.[5]

The relative paucity of significant relationships between school structural and policy variables and reported student smoking is consistent with earlier Australian research.[4] Due to the tendency for editors to choose not to publish reports of non-significant findings,[14] this may account for the small number of research papers addressing this issue. Alternatively, the lack of significant results may be due to the use of school data as reported by teachers and student smoking data as reported by students. Problems in this type of reporting have been identified in relation to studies of gender differences in computing participation, attitudes, and achievement, which have shown that there are few differences reported in studies relying on teacher-supplied data and quite marked differences in studies relying on student self-report data.[15] Often students have limited awareness of the school policy unless this is reinforced by signs around the school, information in school communications, and teaching within related curriculum areas. Before it is concluded that school structural variables have limited influence on students' reported smoking, these variables should be explored using student reports of school policies and practices, and measures of amounts as well as prevalence of smoking. If school structural variables again show limited association with student smoking behaviour this would clearly indicate that this is one set of variables that may not require further research, leading to the re-direction of research efforts towards other factors, such as the roles of school climate, the family, media, and peer group. On the evidence presented here and the

limited evidence from other studies it seems that what students bring to the school is more important than what the school brings to the students in determining smoking prevalence among secondary school students.

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Santiago Lyon, Associated Press

Women selling cans of baby food on a street in Baghdad, Iraq

COMMENTARY

The panty hose caper

Joy Rockenbach, Rod Himon, David Bourne

Magazines which advertise cigarettes often omit from stories on health any information on the harmful effects of smoking.[1,2] Publishers apparently fear that cigarette companies will buy fewer ads in their magazines if they report on the link between smoking and disease. This omission of information on smoking-related disease is a type of self-censorship.

Self-censorship may be seen not only in the editorial policy of magazines, but in marketing for other consumer goods. We present an example of self-censorship in marketing for women's hosiery.

Recently, some Hanes hosiery products have included a package insert "Created by *Glamour* and funded by Hanes Hosiery", as part of a national breast-health programme (see figure). The insert gives instruction in how to perform breast self-examination. It also advises patrons to eat more fruit and vegetables, reduce fat in the diet, exercise regularly, have an annual clinical breast examination, and obtain a mammogram when indicated. No advice is given to stop smoking or not to start smoking.

Hanes and *Glamour* magazine deliver a worthwhile health message on breast-health and "other things you can do for good health". If the insert were on a single topic (breast-health), the omission of a health warning on smoking would be more understandable and perhaps reasonable. However, by failing to mention smoking in the broad range of topics covered (low-fat diet, fruit and vegetables, beans and whole grains, exercise, mammography), they are self-censoring. *Glamour* publishes cigarette ads, conducts biased surveys on "smokers' rights", and avoids reporting on the link between smoking and disease.[3–5] *Glamour* denies that cigarette advertising influences their health coverage.[6]

Not smoking is far more effective in preventing death from cancer than breast self-examination, a low-fat diet, or exercise. The importance of the message to avoid smoking is underscored as lung cancer annually kills more US women than breast cancer. Early detection of breast cancer can reduce mortality by 30%,[7] while not smoking will prevent 87% of lung cancers from ever developing.[8]

At the bottom of the package insert appear the emblems of collaborating agencies: the National Cancer Institute (NCI) and the American Health Foundation (AHF). By allowing the use of their emblems, these agencies give explicit approval to these health messages and implicit approval to the omission of advice about not smoking. It would be regrettable if these agencies consciously approved of this omission.

Also implicit in this message to the consumer is the notion that Hanes, *Glamour*, the NCI, and AHF are joined to improve the health of the public. Hanes and *Glamour* receive a boost to their public image, appearing as responsible corporate citizens interested in the health of their consumers. At the same time, they are safeguarding their income from tobacco advertisers through this act of self-censorship.

Health advocates must be alert for other examples of self-censorship and should expose this seamy side of product marketing.

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The opinions expressed herein are those of the authors and do not necessarily reflect those of the Arkansas Department of Health.

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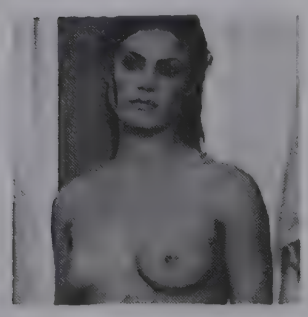
Good looks start with good health...

What you do today and throughout the year can make a difference in your future—that's the message of Glamour/Hanes Hand in Hand, *a national breast-health program. For example, by examining your breasts once a month*, you can learn what is normal for your breasts and how they change from time to time.*



1. *Standing before a mirror, inspect both breasts for anything unusual—a discharge from the nipples; an inverted nipple; puckering, dimpling or scaling of the skin; any change in the shape or contour of your breasts. Still looking in the mirror, repeat with your hands clasped behind your head and with hands pressed on hips.*

2. *Examining breasts while in the shower or with powder or lotion reveals changes easily. Raise your left arm. Press the flat part of three or four fingers of your right hand in small circles on your left breast. Move fingers in circles slowly around the entire breast. If you prefer, move your fingers up and down in vertical lines.*

3. *Start examining your breasts at the outer edge; work toward the nipple, covering the entire breast, including the underarm area and up to the collarbone. Next, raise your right arm and examine your right breast with your left hand. Repeat the exam lying down. If you find anything unusual, contact your doctor right away.*

*The best time is two to three days after the end of your menstrual period. If you aren't menstruating, pick an easy-to-remember date, such as the first of the month. If you are taking hormones, talk to your doctor about when to examine your breasts.

GLAMOUR Hanes HOSIERY HAND-IN-HAND

Created by Glamour and funded by Hanes Hosiery

Other things you can do for good health:

Eat more fruits and vegetables, beans and whole grains.

•

Reduce the fat in your diet.

•

Exercise regularly.

•

Have a health professional examine your breasts once a year.

•

Ask your health professional how to examine your breasts yourself. Also ask when you should have a mammogram. Guidelines for most women (follow your doctor's specific recommendations): Ages 40-49, every 1-2 years; age 50 and over, annually.

•

For more information, call the Cancer Information Service, 1-800-4-CANCER
U.S.A. ONLY

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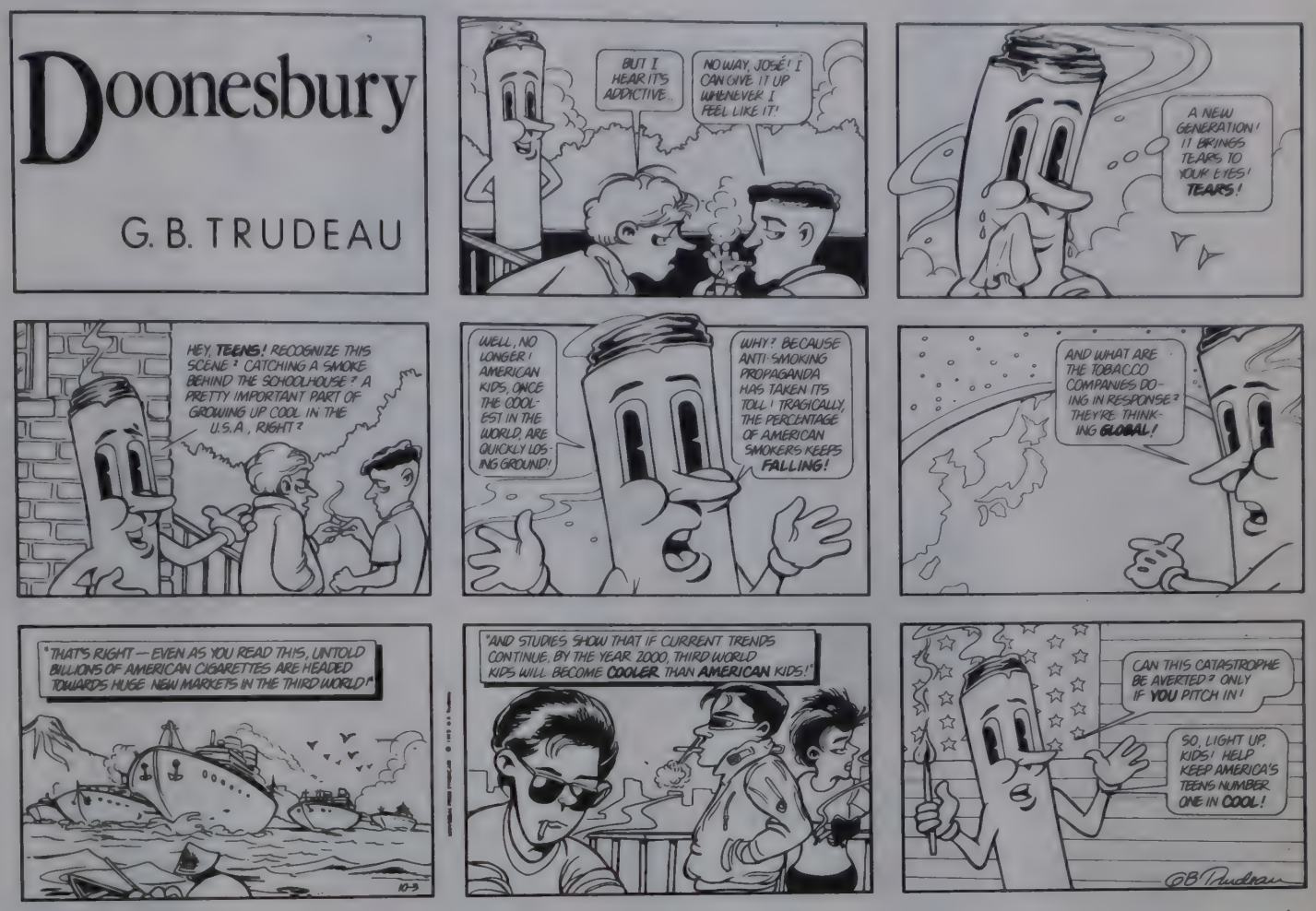
The Lighter Side

Send contributions for The Lighter Side to Philippe Boucher, Comité National Contre le Tabagisme, 66 rue des Binelles, BP13, 92310 Sèvrès, France (Tel (331) 46 23 1515; fax (331) 46 23 1840)

Mr Butts goes to Asia


Doonesbury
G. B. TRUDEAU
BUT I HEAR IT'S ADDICTIVE...
NO WAY, JOSÉ! I CAN GIVE IT UP WHENEVER I FEEL LIKE IT!
A NEW GENERATION! IT BRINGS TEARS TO YOUR EYES! TEARS!
HEY, TEENS! RECOGNIZE THIS SCENE? CATCHING A SMOKE BEHIND THE SCHOOLHOUSE? A PRETTY IMPORTANT PART OF GROWING UP COOL IN THE U.S.A., RIGHT?
WELL, NO LONGER! AMERICAN KIDS, ONCE THE COOLEST IN THE WORLD, ARE QUICKLY LOSING GROUND!
WHY? BECAUSE ANTI-SMOKING PROPAGANDA HAS TAKEN ITS TOLL! TRAGICALLY, THE PERCENTAGE OF AMERICAN SMOKERS KEEPS FALLING!
AND WHAT ARE THE TOBACCO COMPANIES DOING IN RESPONSE? THEY'RE THINKING GLOBAL!
"THAT'S RIGHT — EVEN AS YOU READ THIS, UNTOLD BILLIONS OF AMERICAN CIGARETTES ARE HEADED TOWARDS HUGE NEW MARKETS IN THE THIRD WORLD!"
10-3
"AND STUDIES SHOW THAT IF CURRENT TRENDS CONTINUE, BY THE YEAR 2000, THIRD WORLD KIDS WILL BECOME COOLER THAN AMERICAN KIDS!"
CAN THIS CATASTROPHE BE AVERTED? ONLY IF YOU PITCH IN!
SO, LIGHT UP, KIDS! HELP KEEP AMERICA'S TEENS NUMBER ONE IN COOL!
©B Trudeau

AS THE POLITICAL MOMENTUM AGAINST SMOKING CONTINUES TO BUILD...
...AND I PROPOSE A NEW CIGARETTE TAX!
10-4
...U.S. TOBACCO COMPANIES PLY THE GLOBE, LOOKING FOR NEW, UNEXPLOITED MARKETS.
THERE'S ONE!
!?
INDEED, IN CHINA...
EVEN AS MR. CLINTON SPEAKS...
©B Trudeau
...MR. BUTTS IS HOSTING A TOWN MEETING.
IS SMOKING BAD FOR YOU?
NO. NO, IT'S NOT. GOOD QUESTION, THOUGH!
MR. BUTTS IS CONDUCTING A TOWN MEETING IN CHINA...
MR. BUTTS, WHAT KIND OF IMPACT ARE U.S. CIGARETTES HAVING IN ASIA?
DRAMATIC! BEFORE TRADE BARRIERS WERE LOWERED, ONLY ADULT MEN SMOKED. BUT THANKS TO AMERICAN ADVERTISING AND PROMOTION, ALL THAT'S CHANGED!
10-5
TODAY, THROUGHOUT ASIA, WOMEN ARE NOW SMOKING IN GROWING NUMBERS! IN KOREA, FOR INSTANCE, THE NUMBER OF TEENAGED GIRL SMOKERS JUMPED 450% IN ONE YEAR! WE'RE PROUD OF THAT!
SO YOU'RE PROMOTING FAIRNESS?
BINGO! GIRLS WERE MISSING OUT ON THE GLAMOUR!
©B Trudeau

MR. BUTTS, HOW COME THERE IS SO MUCH ADVERTISING FOR AMERICAN CIGARETTES? THEY'RE NOT EVEN AVAILABLE IN CHINA.
BUT THEY WILL BE — IN 1995! THE U.S. COMPANIES ARE JUST GEARING UP, CREATING THE IMAGES FOR EXCITING NEW CONSUMER CHOICES AHEAD!
MARLBORO, WINSTON, SALEM — THESE NAMES CONVEY CACHET! COMPARE 'EM TO YOUR OWN STATE-PRODUCED BRANDS — WHAT'S THE MOST POPULAR?
"DEATH-TO-THE-FOUR-COCKROACHES 100's."
NO OFFENSE, BUT I REST MY CASE!
...AND TO HELP YOU CATCH THE EXCITEMENT OF AMERICAN TOBACCO, U.S. COMPANIES WILL BE HOSTING CONCERTS, TENNIS MATCHES, BIKE RACES AND FASHION SHOWS!
MR. BUTTS, ISN'T THERE A DOWNSIDE TO ALL THIS? DON'T YOUR EXECUTIVES WORRY ABOUT THE MORALITY OF CREATING HUGE NEW MARKETS FOR WHAT IS BASICALLY POISON?
10-7
WORRY? OUR EXECUTIVES ARE PAID A LOT NOT TO WORRY! DO YOU THINK YOUR LEADERS "WORRY" ABOUT POISONING PEOPLE. WHEN THEY BUILD CHEMICAL PLANTS BESIDE RIVERS?
GB Trudeau
BUT OUR LEADERS ARE TYRANTS.
HEY, WINNERS DO WHAT IT TAKES!
MR. BUTTS, I'D LIKE TO BE A GLAMOROUS MARLBORO MAN IN THE STYLE OF THE COWBOY, PROUD AND PHYSICALLY FIT...
10-8
BUT WE HAVE HEARD THAT WITH THE CURRENT TREND, OVER 50 MILLION OF MY GENERATION WILL DIE FROM TOBACCO IN CHINA...
SURE, BUT REMEMBER, SON, THAT'S NOT ALL SMOKERS! ANECDOTALLY, YOU'LL PROBABLY LIVE TO BE 100!
ANECDOTALLY?
SURE! SEE, THE MARLBORO MAN IS AN INDIVIDUAL. HE LIVES OUTSIDE THE STATISTICS!
GB Trudeau
MR. BUTTS, I HAVE A PROBLEM. HERE IN CHINA, IT'S NOT ACCEPTABLE FOR GIRLS TO SMOKE!
WELL, THAT'S BOUND TO CHANGE, MISSY! IN TAIWAN, FOR EXAMPLE, BEFORE U.S. TOBACCO COMPANIES ENTERED THE MARKET, ONLY 1% OF GIRLS HAD EVER SMOKED...
10-9
BUT AFTER ONLY FOUR YEARS OF ADVERTISING, THAT FIGURE CLIMBED TO 20%! SO THERE IS HOPE FOR YOU!
COOL! 'CAUSE I LOVE BEING A GIRL!
LOTS OF GIRLS DO! THAT'S WHY WE ACTED!
GB Trudeau

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BOOKS

Book reviews and books of interest to Tobacco Control *should be sent to Simon Chapman, deputy editor, at the address given on the inside front cover.*

Preventing addiction in youth

Growing up tobacco free: preventing nicotine addiction in children and youths. BS Lynch, R J Bonnie, eds. Prepared by the Committee on Preventing Nicotine Addiction in Children and Youth, Division of Biobehavioural Sciences and Mental Disorders, US Institute of Medicine, Washington DC, USA. 1994. ISBN 0-309-05129-0, pp 306, $24.95.

Each day approximately 3500 Americans stop smoking and an additional 1200 customers and former customers die of smoking-related illness; therefore, maintaining current levels of tobacco use and revenues requires that approximately 5000 new smokers be recruited every day.

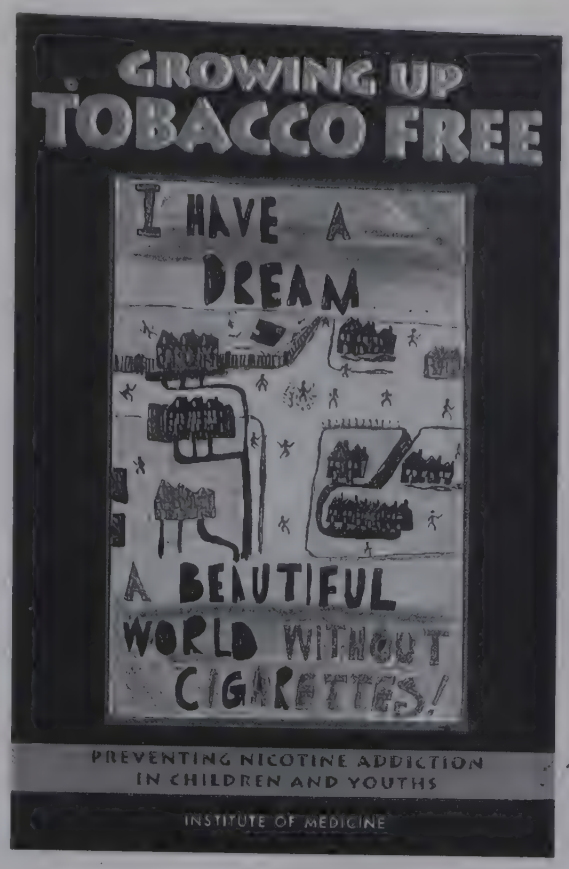
These stark facts presented in this report from the US Institute of Medicine illustrate the importance of the youth market for the tobacco industry, and give some insight into the enormity of the challenge faced by health policy makers and practitioners in reducing the number of new tobacco users.

This report follows hard on the heels of the US Surgeon General's 1994 report *Preventing tobacco use among young people* (*see Tobacco Control* 1994; 3: 176–84), and should have a further subtitle which reads "everything the Surgeon General's report wanted to recommend but wasn't able to".

Not surprisingly, the report covers territory similar to that of the Surgeon General's report. However, this report is not a simple repackaging of the information contained in the Surgeon General's report. It goes much further in the links it draws between scientific knowledge and social policy. The report provides "practical, science-based policy recommendations", which greatly extend and strengthen the conclusions reached by the Surgeon General's report.

The report is distinguished by the close attention it has given to the evidence concerning the addictive nature of tobacco use, even in small quantities by young people, and the compelling argument this provides for a strengthened policy response to counter the aggressive marketing of tobacco products to young people in the US. The report indicates clearly how the adoption of a wider set of marketing methods by the tobacco industry over the past 20 years has ensured that young people are continually exposed to subtle and persuasive messages which reinforce positive views of smoking behaviour. Against this, the report has also assembled evidence to indicate how a reduction in youth smoking has been associated with serious restrictions on the advertising and marketing of tobacco products.

Several key recommendations are made for short- and long-term activities. These include in the short term, action by the US Congress to substantially increase federal



taxes on tobacco, and to repeal existing preemptive legislation that prohibits state and local governments from regulating tobacco promotion and advertising. In the longer term the report advocates action by Congress to establish a regulatory program for tobacco products with a public health objective of reducing the promotion of nicotine addiction – in short to regulate more substantially the content, packaging, and availability of tobacco products in the US.

In summary, the report carefully and cleverly assembles a range of evidence concerning the addictive nature of tobacco use, the ease of access, and the skilful promotion of tobacco products to young people, all of which require a positive policy response from the government. The report then goes on to recommend a range of different policy actions which would have an impact at local, state, and national levels on access to, promotion of, and use of tobacco products by young people.

The timing of publication of this book, so soon after the Surgeon General's report, provides public health advocates in the US with a powerful weapon to use in the continuing fight to reduce the use of tobacco products by young people. Although the report is exclusively directed at the situation in the US, as an assembly of information, and as an example of the use of scientific knowledge in the formulation of public health policy, it will serve as a useful reference text for public policy makers and tobacco control activists.

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Tobacco and the clinician

Tobacco and the clinician. Interventions for medical and dental practice. Smoking and tobacco control. Monograph 5. US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, 1994. (NIH Publication No 94-3693.) 398 pp.

The list of contributors to this National Cancer Institute (NCI) monograph reads like a Who's Who of North American (mainly US) researchers in medical and dental smoking cessation. A valuable feature is the range of settings in which these NCI-supported studies have occurred, including family practice, hospitals, health maintenance organisations, public and private obstetrics units, paediatrics, head and neck cancer clinics, dental practices, and workplaces. However, readers who expect to find descriptions of new studies will be disappointed. Most of these trials were funded in the early 1980s and the key outcome data have already been reported in peer-reviewed literature. The stated purpose of the monograph is to go beyond a review of cessation outcomes to include detailed descriptions of the programme content and strategies. In addition, contributors were asked to assess which approaches were effective, which were ineffective, and what they would do differently if they could repeat their projects. It is argued that the monograph presents the current best judgment of how to implement and sustain an office-based cessation effort.

In the foreword, there is a useful reminder of how much the pro-health lobby has achieved, especially in relation to male smoking, despite the tobacco industry's systematic, misinformation campaign. However, the enormity of the task still remaining is also emphasised. Two seeming paradoxes confront those working in smoking cessation. Firstly, although the vast majority of smokers say they would like to quit, few actually succeed each year. Even in cessation trials which report significant but small improvements in quit rates at one year follow-up, there remains the lingering doubt that these apparent gains may have been achieved by "borrowing from the future". Secondly, nearly all doctors endorse the view that smoking cessation is important, but only a minority routinely counsel most of their smoking patients. The difficulty of effecting sustained change in smoking behaviour is discussed and the notion of the clinician as a provider of "magic bullets" is rightly dismissed. This accords with Shiffman's finding that average treatment outcomes have not improved since the mid-1970s.[1]

Data in the monograph also demonstrate that changing providers' behaviour is at least equally demanding. Although high consent rates were achieved in dissemination studies involving internists and physicians in training, those involving voluntary participation of private practitioners were only able to recruit a small proportion of eligible physicians. While these studies have shown that 3–4 hours of training significantly improves the performance of volunteer doctors, it is disappointing that this is frequently not reflected in improved patient quit rates for the trained group. Approaches involving the recruitment of all the practices in a geographic area are said to offer more promise for increasing participation rates but even then provider compliance is fairly disappointing, given the demands on the research team. For example, Kottke *et al* report that an evaluation of a programme which involved an average of 5.7 site visits, 24.0 telephone calls, and 5.6 mailings per practice site still resulted in less than 20% of practices keeping complete smoker progress records. These findings make it clear that smoking cessation programmes in medical settings should only be one element of a comprehensive tobacco control programme.

Another important issue stimulated by reading this compilation is the powerful influence exerted by Prochaska and Di Clemente's model[2] both on programmes designed to alter patient behaviour and those seeking to improve doctor practice. Although this model has considerable face validity and predicts behaviour in longitudinal studies, it has not been shown that programmes which incorporate this model achieve better quit rates than programmes which do not. It is worth remembering that work in the area of relapse prevention which promised so much, has so far delivered little in terms of improved outcomes in controlled trials.

A potentially controversial issue concerns whether the cessation guidelines offered to doctors in many of these trials are unnecessarily prescriptive. A recent meta-analysis on the efficacy of nicotine replacement therapies reported that the odds ratio of abstinence was largely independent of the intensity of the additional support provided or the setting. Admittedly, many of the trials reviewed by Silagy *et al*[3] were not in medical practice. However, even in the NCI monograph, two studies (Lindsay and Wilson; Goldberg *et al*) failed to show a significant improvement in long-term, validated cessation in the group offered additional appointments. On the other hand, Kottke *et al*'s meta-analysis found that both the number of programme contacts and the length of time that the subject was in contact were associated with success. It appears that the question of follow-up warrants further examination.

Finally, although the monograph contains a helpful index, its utility would have been increased by the inclusion of a structured abstract on each sub-chapter.

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3 Silagy C, Mant D, Fowler G, Lodge M. Meta-analysis on efficacy of nicotine replacement therapies in smoking cessation. *Lancet* 1994; **343**: 139–42.

LETTERS TO THE EDITOR

Letters intended for publication should be a maximum of 400 words and 10 references and should be sent to Simon Chapman, deputy editor, at the address given on the inside front cover. Those responding to articles or correspondence published in the journal should be received within six weeks of publication.

Euphoriant effects of nicotine

To the Editor – The recent "debate" created by the tobacco industry on whether nicotine is addictive has brought to the fore the thorny question of what drug effects constitute addiction. The industry has attempted to mount the case that *a*) in order to qualify as addictive, a substance, in addition to meeting the standard criteria for tolerance and withdrawal, must also induce a state of intense euphoria; and *b*) nicotine does not meet this requirement because nicotine has not been shown to produce dose-related euphoriant effects.[1–3]

Setting aside the question of whether euphoriant effects are essential to the concept of addiction, a position no longer widely held outside the tobacco industry, it is not correct that such a dose-response relationship has never been reported. Euphoriant effects of nicotine were clearly demonstrated as early as 1978.[4] Henningfield and colleagues have shown increases in drug liking for both intravenous nicotine and inhaled tobacco smoke that are both blockable by mecamylamine[5] and dose-related.[6,7] We took a somewhat different approach,[8] asking subjects to push a button when a euphoric sensation was experienced and to keep it depressed for the duration of the sensation; and using increase in venous blood nicotine concentrations rather than cigarette strength as an index of dose, because smokers can so easily adjust nicotine intake. These effects were experienced by 19 of the 22 smokers we tested (86%); they were more pronounced following overnight abstinence than following minimal deprivation, in more dependent smokers, and as a function of plasma nicotine increment upon smoking. These sensations are experienced intermittently during the smoking of a cigarette and are therefore easy to miss if smokers are queried at specified, standardised intervals. Once we instituted a subject-initiated procedure, the phenomenon proved quite readily detectable.

During the review process for that paper, one reviewer raised the question of whether the pleasurable effects reported by subjects actually constituted euphoria, pointing out that subjects may have depressed the button in response to feelings of dizziness or intoxication. In response to this critique, we set up two foot-pedals, the right one (the "accelerator") labelled with a smiling face and the left (the "brake") with a frowning face. The following instructions were provided: *People sometimes report experiencing pleasurable or euphoric sensations when they smoke that might be described as a rush, a buzz, or a high. Not everybody experiences these sensations. If you happen to experience any of these pleasurable sensations while smoking today, please depress the right foot pedal and hold it down for the duration of the sensation. If you experience an unpleasant sensation, please depress the left foot pedal for the duration of the sensation. Please smoke your cigarette now.* (It should be noted that in all the years we have used this apparatus, not one smoker has ever indicated that s/he was confused or did not know what we were talking about when we described smoking-induced euphoric sensations.)

In a recent study involving 15 male smokers (mean ± SD age: 29.8 ± 7.5 years; mean ± SD cotinine level: 222.7 ± 152.1 ng/ml, characterising them as moderately heavy smokers), we found that 12 of the 15 smokers (80%) reported at least one euphoric sensation during the smoking of a single cigarette following approximately 12 hours abstinence from smoking. Mean ± SD number of sensations was 3.6 ± 3.7, and total time spent in this state (mean ± SD) was 127.4 ± 168.4 seconds. By contrast, only six smokers (40%) experienced any dysphoric sensations, and total time spent in this state was 15.6 ± 39.8 seconds. There was no significant correlation of either the number ($r = -0.32$, NS) or duration ($r = -0.27$, NS) of euphoric with dysphoric sensations. Both the number ($r = +0.62$, $p < 0.05$) and duration ($r = +0.73$, $p < 0.005$) of dysphoric sensations were highly correlated with self-reported change in nausea measured using visual analogue scales presented before and 30 minutes after smoking, whereas no such significant correlations were seen for euphoric sensations (number: $r = -0.19$, NS; duration: $r = -0.27$, NS).

We conclude that smokers experience both euphoric and dysphoric sensations, though many more of the former, and that they have no trouble in distinguishing them from one another. We further conclude that the dysphoric sensations are indicative of nicotine intoxication, whereas the euphoriant effects probably reflect nicotine's actions on reward-relevant brain systems.

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